

# Air Conditioning & Refrigeration News

The Newspaper of the Industry

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## Meeting Bares New Views on Air Conditioning

Illinois U. Conference Indicates Changes Needed In Practice

By Henry Knowlton

URBANA, Ill.—Most recent thinking by industry authorities on air-conditioning engineering and installation problems together with warnings against some pitfalls in air-conditioning practice were brought to light at the 1939 Conference on Air Conditioning held at the University of Illinois here last week. The meetings were attended by approximately 200 engineers, dealers, and installers from several adjacent states.

Significant statements made during the meeting:

Dr. Charles Sheard, the Mayo Foundation: "In the region of vasomotor regulation, below the point where sweating begins, relative humidity has no effect on the temperature of the extremities . . . a 1° change in temperature will have more effect on physiological reactions than a 30 to 80% change in relative humidity."

W. D. Gerber, engineer, Illinois Water Survey: "Well diggers are the biggest liars and best gamblers in the world . . . air-conditioning contractors should be careful before making investments in wells . . . air-conditioning engineers should not draw on an underground water supply that is receding at the rate of about one foot per year . . . putting water back in a second well is seldom satisfactory because precipitation of minerals, especially iron, may clog the well."

P. E. Mohn, assistant professor of mechanical engineering: "Air filters should be placed both 'upstream' and 'downstream' from an electrostatic precipitator to prevent overloading the device and to keep 'bunches' of collected dust from entering the air stream."

Prof. M. K. Fahnestock: "Staining of walls above or near grilles may be caused by aspiration of room air to the grille and not by air flowing through the air-conditioning system."

S. H. Downs, chief engineer, the Clange Fan Co.: "Resistance in any duct system will vary in accordance with the square of the volume of air passing through it . . . fans will deliver only the performance the system will permit and any changes in system characteristics will change the recorded fan operation."

Prof. D. W. Nelson, University of Wisconsin: "Design conditions for the satisfactory distribution of cool air must take into consideration the length of time the space is occupied,"

(Concluded on Page 8, Column 1)

## Program Completed For ASRE Meeting

HERSHEY, Pa.—Subjects ranging from the use of refrigeration in the chocolate plant to the air conditioning of passenger buses will highlight a varied technical program at the twenty-sixth spring meeting of American Society of Refrigerating Engineers, to be held in Hotel Hershey, May 21-23.

Regular technical sessions this year will be devoted principally to refrigerating machinery and air conditioning, while the informal conferences, scheduled for the two afternoons of the session, will be turned over to discussions of transportation refrigeration and piping practice.

Hershey, the "chocolate town," is only 13 miles from Harrisburg, and easily accessible by rail or auto.

(Concluded on Page 2, Column 1)

## 2 Texans Named To Air Conditioning Dealers Council

DETROIT—J. N. Sprekelmeyer, General Air Conditioning Corp., York distributor, Forth Worth, Tex., and A. J. Mitchell, Straus-Frank Co., Carrier distributor, Houston, Tex., have been appointed to the Temporary Council of the proposed National Air Conditioning Association by Chairman John H. Keller of Mechanical Heat & Cold, Inc. here.

Mr. Sprekelmeyer has been active in the air-conditioning industry for many years, having been a distributor for Kelvinator and Carrier before taking on the York franchise.

General Engineering Corp., of which he is president, manufactures heavy-duty evaporative type air-washing equipment which is installed in connection with mechanical cooling in many sections of the Southwest.

The Air Conditioning Association of Fort Worth unanimously approved the appointment of Mr. Sprekelmeyer at a recent meeting, and voted to back the growing movement toward a national association.

Present at the Fort Worth meeting were: Crawford L. Gilligan and J. D. Higgins, Baker Ice Machine

(Concluded on Page 8, Column 3)

## Wm. Price Resigns as Carrier Sales Chief

SYRACUSE, N. Y.—William H. Price, Jr. has resigned as vice president in charge of sales of Carrier Corp., a position he has held for the past three years. He has not announced his future plans, and no successor to his post has as yet been appointed.

After graduating from Massachusetts Institute of Technology, Mr. Price engaged in technical and sales work in the paper, rubber, and wrapping machinery industries before entering the heating and ventilating business.

In 1927 he joined the York Heat-

(Concluded on Page 19, Column 1)

## Wesco Purchases Iron City Electric

PITTSBURGH—Purchase by Westinghouse Electric Supply Co. of the Iron City Electric Co., 30-year old local concern, has been announced by Bonnell W. Clark, president.

Under the new management, Warren I. Bickford, former secretary and treasurer of the Iron City Electric Co., becomes district manager of Westinghouse Electric Supply Co., and Charles W. Ridinger,

(Concluded on Page 11, Column 5)

## Utility's Promotion Effort Is Real Sales Help To St. Louis Air-Cooling Dealers

By Henry Knowlton

ST. LOUIS—An aggressive and courageous group of distributors and dealers, a low power rate, and a friendly utility combine to make St. Louis known as the "Air Conditioned City."

Cooling is needed for from 100 to 114 days during the summer, when either high humidities or high temperatures, or a combination of both, make air conditioning of great benefit to human comfort. On the basis of installed tonnage per capita, St. Louis ranks high on the list of American cities.

Most of the important St. Louis hotels have air conditioning in every room; the total now reaching nearly 2,000 rooms.

The city boasts over eighty air-conditioned restaurants, 200 retail stores, 13 completely air-conditioned apartment buildings, 4 broadcasting studios, 30 entire office buildings,

## Sales In January Second Best In Industry History

Total of 155,500 Units Represents Increase Of 43% Over '38

DETROIT—The household electric refrigeration industry is definitely on the upgrade. World shipments during January this year totaled 155,500 units, an increase of 43% over figures for the corresponding month of last year, according to estimates by AIR CONDITIONING & REFRIGERATION NEWS.

World sales estimates for January, 1938, were 112,500 units, so that this year's first-month figure represents a numerical sales gain of 43,000 units. January shipments this

### All Appliances Up

With electric refrigerators second only to the 1937 all-time high and electric ranges and water heaters at their best marks in the past four years, January shipment figures furnish strong evidence that the "big three" of the appliance family are at least well on their way "out of the woods."

January electric range shipments of 28,074 units are an increase of 52% over the 1938 total of 18,500 for the month, and a noteworthy improvement over the 1937 mark, 26,160. Biggest percentage gain, however, was set by water heaters.

Four-year comparison of refrigerator, range, and water heater shipments follows:

	Refrigerators	Ranges	Water Heaters
1936	108,985	11,696	3,033
1937	159,417	26,160	3,372
1938	97,641	18,500	2,617
1939	140,052	28,074	5,111

year passed all except the all-time high mark of 181,800 units for the month, established in 1937.

World sales by 15 members of National Electrical Manufacturers Association totaled 147,623 units

(Concluded on Page 19, Column 3)

## TVA Area Sales Again Show an Increase

MUSCLE SHOALS, Ala.—Volume of electrical appliance sales in the Tennessee Valley for 1938 more than doubled that of 1936, and were well ahead of 1937, statistics compiled from dealer reports to the Tennessee Valley Authority show.

Some 400 dealers reporting to TVA showed total household elec-

(Concluded on Page 11, Column 4)

## West Coast Group Opposes 'Package' Promotion Plans

OAKLAND, Calif.—A firm stand against all types of "package" promotions, in which two or more appliances are offered in a combination deal for a price less than they would sell for separately, has been taken by the Appliance Dealer's Protective Association of Alameda and Contra Costa Counties, reports secretary Guy W. Wolf.

The association opposes "package" promotions of this type, Mr. Wolf explains, because:

1. They open the door to competitive offers, each succeeding one bigger and better than the last.

2. They break down established price structures.

3. They establish the practice of giving something "free" with more and more items of merchandise. If a radio today, why not a range tomorrow, and a watch or set of dishes the next day? he asks.

4. They spoil customers and destroy their sense of values, which long advertising of price merchandise has established in their minds.

5. In the case of items covered by fair trade agreements, they break the price structure, and are in fact a general winking at law violations for the period of the "sale."

6. They get merchants away from sound merchandising practice, and into the field of competitive effort, where the profit grass gets shorter and shorter the longer they stay in it.

## Injunction Denied In Bendix Patent Suit

SOUTH BEND, Ind. — Judge Thomas W. Slick of U. S. District Court here has dissolved a temporary restraining order and refused to grant a temporary injunction against Rev. Earl Bassett, Jr. and John W. Chamberlain, defendants in a suit filed by Bendix Home Appliances, Inc., which seeks to restrain the two men from assigning certain washing machine patents to Borg-Warner Corp.

The case will now be carried over for trial in U. S. District Court on its merits, with hearings scheduled during the May term here.

Meanwhile, Mr. Bassett and Mr. Chamberlain are permitted to continue in the employ of Borg-Warner Corp. Both men formerly were employees of Bendix Home Appliances. The Borg-Warner organization was made a party defendant in the case at its own request.

## E.E.I. Plans Conference On Sales March 21-23

CHICAGO—The consumers' angle on electrical appliances, the electric kitchen, and the advertising-merchandising set-up of electric utility companies will come in for a major share of attention at Edison Electric Institute's national sales conference in the Edgewater Beach hotel, March 21-23.

Three of the six general sessions during the meeting will be devoted to problems concerned with the selling and advertising of major appliances and air-conditioning equipment.

Electrical appliances and electrical living will keynote the morning session on Wednesday, March 22.

Mrs. Mary Davis Gillies, of McCall's magazine, will open the session with a discussion of "Do Electric Appliances Meet Women's Expectations?", and Dr. Kenneth Dameron, professor of marketing at Ohio State University, will suggest methods for "Stepping Up Dealer Sales."

"Selling the Home Market of Tomorrow" will be discussed by J. M. Follin, of the Federal Home Building Service, and Carl M. Snyder of General Electric Co. will close the

(Concluded on Page 9, Column 1)

## '30% Less' To Be MKB Theme on '39 Refrigerator

Test Data Developed For N. Y. '38 Drive To Be Featured

NEW YORK CITY—Led by the "Scotch Eskimo" as the nation-wide symbol of economy and safe food preservation, Modern Kitchen Bureau's electric refrigerator campaign this year is built around actual laboratory test figures which enable dealers to prove that "modern electric refrigerators cost less to operate than any other kind."

Tests on which campaign figures are based were made on 1938 models of electric, gas, and ice refrigerators by Electrical Testing Laboratories for the drive sponsored last year by the Electric Refrigerator Association of New York, Inc.

After six weeks of comparing performance of the units under temperature conditions ranging between 70 and 110° F., it was found that the average modern electric refrigerator consumed 23 kwh. per average month, the average gas refrigerator used 1,655 cu. ft. of 540 B.t.u. gas per average month, and the average ice refrigerator of modern design consumed upwards of 500 lbs. of ice per average month.

On this basis, the statement "electric refrigerators cost 30% less to operate than any other kind" was used in the New York City campaign. By using the performance ratios, together with the household rates in effect in its own area, any community can quickly arrive at its own economy figure . . . and have laboratory tests to back it up.

Photos showing how the actual laboratory tests were made are available for use in local campaigns, if proof material is desired. And the series of six newspaper advertisements prepared by the bureau require only the insertion of the local economy percentage figure to make them applicable to any service area.

In the Electrical Testing Laboratories' tests, representative makes of

(Concluded on Page 11, Column 1)

## Philco Prices Leader At \$89.50 In N.Y.

NEW YORK CITY—An electric refrigerator at \$89.50, a washing machine at \$39.95, and a portable air conditioner at \$150 featured the dealer showing held at Hotel Savoy-Plaza here last week by Philco Distributors, Inc., New York division of Philco Radio & Television Corp.

The low-priced refrigerator, a 4-cu. ft. unit, is one of two leader models in Philco's new Conservador line. List price of the unit actually is \$129.50, but a \$40 trade-in allowance is offered for any old box, electric or otherwise. The other leader model, a 6-cu. ft. unit, lists at \$149.95. All other models in the line are equipped with the Conservador feature, and prices range from \$139.95 for a 4-cu. ft. model to \$249.95 for a 7-cu. ft. box.

Low prices of these leader models are seen as a move to place Philco refrigerators in direct competition with the products of the 13 manufacturers who are cooperating with Consolidated Edison Co. in the utility's huge spring refrigerator campaign. Philco has as yet indicated no intention of joining this cooperative drive, but its prices are, on the average, lower than those of the manufacturers who are cooperating. Lowest list price for a 4-cu. ft. box yet offered by any of the co-operating manufacturers is about \$99, approximately \$10 above the Philco base.

The washer "bargain" offered by

(Concluded on Page 11, Column 3)



## Application of Refrigeration In Various Fields Theme of ASRE Spring Meeting

(Concluded from Page 1, Column 1) mobile from all parts of the country. Sessions of the meeting will be held in the Hotel Hershey, located in the center of M. S. Hershey's 10,000-acre farm, and surrounded by landscaped gardens.

Facilities for tennis, golf, riding, and swimming are offered, and the "model town" with its unusual working and living conditions should be of interest to A.S.R.E. members and their families. Inspection trips to Hershey Corp.'s windowless, air-conditioned office building, and the town's large, modern skating rink are scheduled.

Advance registration, committee meetings, and a golf match on May 21 will precede the opening of technical sessions at 9 a.m. on May 22.

"Methyl Chloride Properties and Tables" will be discussed by E. W. McGovern, of the R. & H. Chemicals department of E. I. du Pont de Nemours & Co., and D. D. Wile, of Savage Arms Corp., will explain "Portable Testing Apparatus for Condensing Units." Discussion of these two papers will be led by C. M. Ashley, of Carrier Corp.

W. R. Hainsworth, of Servel, Inc., will follow with a paper on "Commercial Absorption Machines," and L. S. Morse, of York Ice Machinery Corp., will outline "Refrigeration in the Chocolate Plant."

Chairman of the conference on transportation on the afternoon of

May 22 will be George E. Hulse. Papers scheduled will include "Design of Truck Bodies for Ice Cream," by H. M. Harrington, General Electric Co., and L. M. S. Copper, Erie, Pa.; "Overhead Bunkers Refrigerator Cars," by O. C. Walker, Canadian Pacific Railway engineer; and "Tests on Air Circulation in Precooling," by Dr. F. C. Lindvall, California Institute of Technology.

Mr. Morse will chairmen the session on air conditioning, which will open the sessions on May 23.

"Operation of Government Conditioning Plants" will be explained by Charles A. Peters of the U. S. Department of Interior; "Tests on Refrigeration Storage for Air Conditioning" will be presented by W. F. Friend, Ebasco Services, Inc.; and "Conditioning of Passenger Buses" will be outlined in papers by C. F. Henney, Frigidaire Corp., and another speaker, to be announced.

Conference on piping practice that afternoon will have A. H. Baer as chairman, and will hear papers on "Practice in Low-Pressure Piping," by A. Hafke, Kelvinator Corp. and J. L. Gibson, Frigidaire Corp.; "Practice in Ammonia Piping," by R. C. Doremus, Detroit Ice Machinery Co.; H. C. Guild, Vilter Mfg. Co., and F. R. Zumbro, Frick Co.; "Carrene and 'Freon' Piping," by W. H. Carrier, Carrier Corp.; and "Code for Pressure Piping, Refrigeration Section," by A. B. Stickney, Armour & Co., Chicago.

## Range & Water Heater Story Told To Georgia Dealers In 'Cavalcade'

ATLANTA—"Cavalcade of Electricity" is what Georgia Power Co. termed the series of educational meetings which it recently conducted for its dealers to place emphasis on the merchandising of electric ranges and water heaters.

Designed to instruct salesmen in the fundamentals of their profession, the program was presented by representatives of some 10 Georgia range and water heater distributors in cooperation with H. A. Smeeton, the utility's dealer coordinator, and Guy Lines, Georgia Power's kitchen planning engineer.

Skits, dramatizations, and talks dealing with the following subjects were featured on the program: Georgia Power Co.'s merchandising policies for 1939; advantages of electric cookery; cost of operating an electric range; merits of the CP gas range and a modern electric range; how to use the kitchen planning story, and the availability of kitchen planning assistance; advantages of electric water heating; the dealer and his salesmen, good and bad.

No particular brand of product was plugged on these programs, nor was any equipment displayed. Meetings were held in nine cities: Rome, Columbus, Albany, Macon, Vidalia, Augusta, Athens, Gainesville, and Atlanta.

Committee in charge of the "Electrical Cavalcade" estimated that nearly 500 dealers were on hand.

## THE COLD CANVASS

By B. T. Umor

### Shake Hands? Sure!

Scranton, Pa.

Dear old B.T.U.:

Now you put one over on me—I tied the tin can to the wrong tail, and so did you. Sears has nothing to do with my letter, and I'm just a 3d rate luminary in this organization—and honest, B.T.U. I've never in my life written for publication.

But it's alright with me; if I had been working for General Electric or Westinghouse and you had published those two letters from some "Nit-Wits" that should be selling Krauter-kaese instead of refrigerators, I would have answered the same way—for ethical reasons; well it's just not beeing done. Let's all practice the Golden Rule.

Now by the way B.T.U., I feel terribly guilty—and I hope, George will forgive me, that I picked on him; it shall never happen again. Scouts Honor!

Now let's shake hands and call it Curtain!

PAUL WITTE

P.S. Please don't blame the Sears Boys in Chicago for this, or I may loose my job.

### Applesament?

The President and his trusted policy-suggester, Hopkins, don't like the current phrase, "business applesament." They suspect it has an implied back-kick in the hint that New Deal policies have done something to business that deserves apology.

Just a slight change in spelling might help. How about "applesament"? Make it applesament and mean it and the whole nation will applaud! So says the Detroit News.

How about applesaucement?

### Cooling Off the 'Hot' Words

British scientists have discovered that a 4-inch layer of snow, spread on the floor of a small room, absorbs more than nine-tenths of high-pitched sounds. High-pitched consonants, which are what make words meaningful, are also "censored" by a blanket of snow.

When we are shrivelling under a verbal blistering by friend wife as she looses a string of particularly "meaningful" words, we can't help envying the serene Eskimo standing on a couple of miles of snow yelling the equivalent of "Louder, you old battleaxe, I can't hear a word you're saying."

### Woe, Woe on the Range

"Shel" Myers, Westinghouse air-conditioning missionary, received a letter from a friend of his who recently purchased an electric range. "Shel" insists that the moral of the story is "Buy an Electric Range and give more idle men work." Anyway, here's what the harassed friend wrote:

"Did you hear about all the tough luck I have had since we got the electric stove? I don't think anyone in the world has had any worse hard luck story than the one I am about to relate to you, and I am wondering if you have ever heard the equal.

"First I get the stove, then the stove has to go where the kitchen cabinet stood and the kitchen cabinet has to go in the specially built place for the original stove, when the kitchen cabinet is set there they can't open the doors of it so they cut off the legs a few inches, then the porcelain top of the kitchen cabinet is too low and the whole thing looks like hell.

"Well, we get the carpenters and have them build in a new kitchen cabinet, the kitchen cabinet requires some new wiring so we get in the electrician, then the cabinet has to be painted, when that is done, the kitchen walls look like hell and they have to be painted, then the curtains look like hell and we have to get new ones then we can't sell the old stove so we get the plumber to connect it up in the basement, then the linoleum on the floor don't match and we get new linoleum.

"Then the chrome fixtures on the

new cabinet, don't match with the old ones on the other cupboards and we have to get new fixtures clean through, then we wax the floor, Betty runs to answer the phone, slips, and breaks her arm, and just right now I get a phone call that some damn dog has just bitten Sara while she was playing at recess at school.

"Tonight I am driving to Massillon and the roads are slippery, maybe the next letter you get from me will be mailed from Hell."

### Class of 1914



H. H. (JOE) KUHN

"Dear Doc," writes H. H. (Joe) Kuhn, vice president of the Kansas City Power & Light Co., in a letter to F. M. Cockrell, publisher of the NEWS:

"It will soon be some 25 years since you and I separated after a successful campaign to make Mark Van Doren president of the Senior Class of 1914. I believe we were both graduated in engineering, and you have probably gotten further away from it as president of a publishing company than I have as I am still on the fringe of the profession by working for one of the much abused public utilities, although my ability to work a problem in calculus would be 100% minus.

"I am hoping to get back to Illinois at commencement time if they have any kind of a 25-year celebration. I usually go back to the Homecoming game and, on some occasions, a second game, but recently my hopes of victory have been so flattened that I did not even order tickets for this year; although, once or twice, I would have gone if I could have induced someone to accompany me."

"Dear Joe," writes F.M.C. to Mr. Kuhn:

"Your reminiscences of 25 years ago are enough to bring tears to my eyes. How tempus does fugit! Or words to that effect. What a pleasure to get a letter from a big public utility magnate and be able to say: 'I knew him when . . .'"

The above-mentioned Mark Van Doren, is now a well-known literary light (Anthology of World Poetry, etc.). His wife, Irita, is book critic for the New York Times. His brother, Carl, is a prof. at Columbia University and author of the biography "Benjamin Franklin" and other popular books.

Mark was editor of the Illinois Magazine back in 1914. "Doc" Cockrell (as he was known then) was business manager of that student publication at the University of Illinois and thereby hangs a tale.

When Mark and Doc acquired control of the magazine, it developed that Mark was interested in the venture as an outlet for his literary talent and as a student honor. Doc, on the other hand, was concerned with it entirely as a means of paying his way through the last year of school.

Mark demurred at Doc's aggressive plans for putting the magazine on a paying basis since it had invariably shown a loss in previous year. So a deal was made. Doc agreed to take the responsibility for all losses, with the provision that he would have all profits, if any. In brief, it was agreed that Mark would get all the honor and Doc would get all the money.

The deal worked out beautifully. Doc made \$1,800. Mark, in addition to being editor, was elected president of the Senior Class.

Joe Kuhn came into the picture as another campus politician whose connivance played an important part in Mark's election. However, Joe modestly declined any direct returns for his contribution. He merely insisted that one of his fraternity brothers be put on the Senior Ball Committee. That was arranged.

"Then I Switched to A-P Valves . . . and Trouble STOPPED!"

(A typical remark from a Service Engineer)

"Here's one reason I prefer A-P Valves on all my 'Year's Warranty' installations.

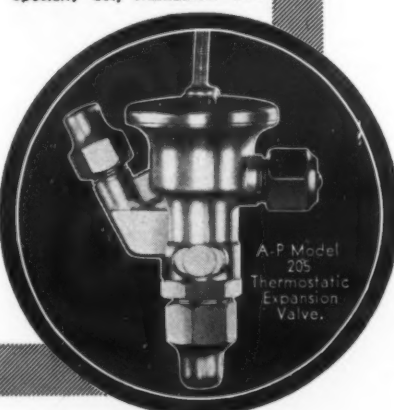
"Superheat Adjustment on other valves is difficult and complicated. But not on the A-P. Just remove the bottom nut and your adjusting stem is right out in front of you."



INSTALLATION  
Elm Grove Store  
Elm Grove, Wis.  
CABINET  
Campbell Refrigerator  
Co., Milwaukee, Wis.  
REFRIGERATION UNIT  
York

VALVES—

Purchased through Refrigeration  
Specialty Co., Milwaukee, Wis.



The "Switch" to A-P Valves is spreading to all phases of Air Conditioning and Refrigeration—Commercial Cabinets, Store Air Conditioning installations of every size and type—Huge Hotel and Industrial Refrigeration and Air-Conditioning.

The Service Engineer working on every job can give you many reasons for A-P Preference—in definite terms of Service-Free and Trouble-Free operation.

A-P Refrigeration Valves are far ahead of their time in design and construction—in super-sensitivity, accuracy of control that invariably mean a Profitable Installation.

**AUTOMATIC PRODUCTS COMPANY**

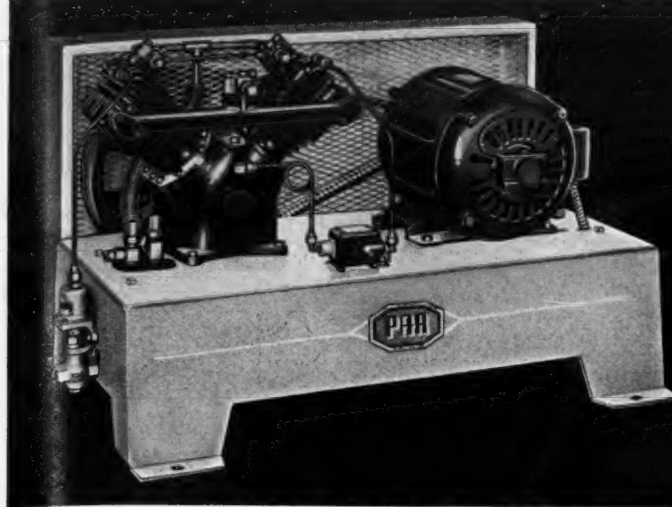
2450 NORTH THIRTY—SECOND STREET  
MILWAUKEE WISCONSIN

**Refrigeration Valves..**

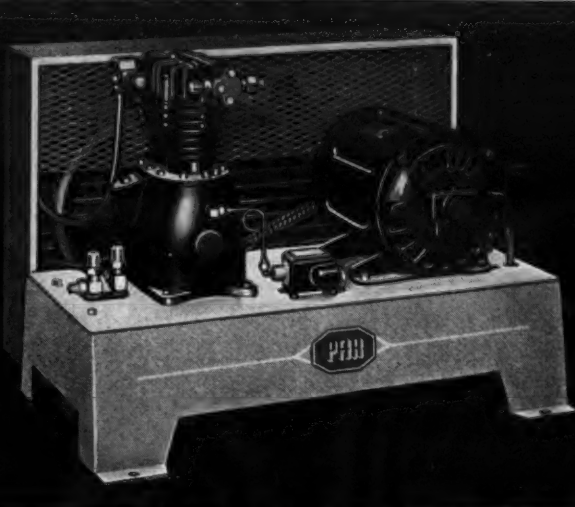
**DEPENDABLE**

THE BYWORD FOR CONTROLS

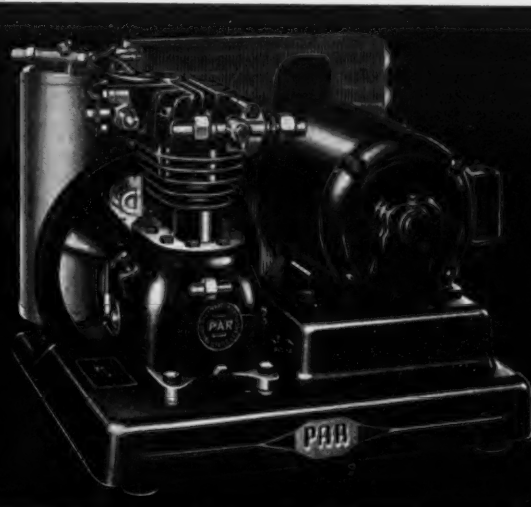




PAR Water-Cooled Highside



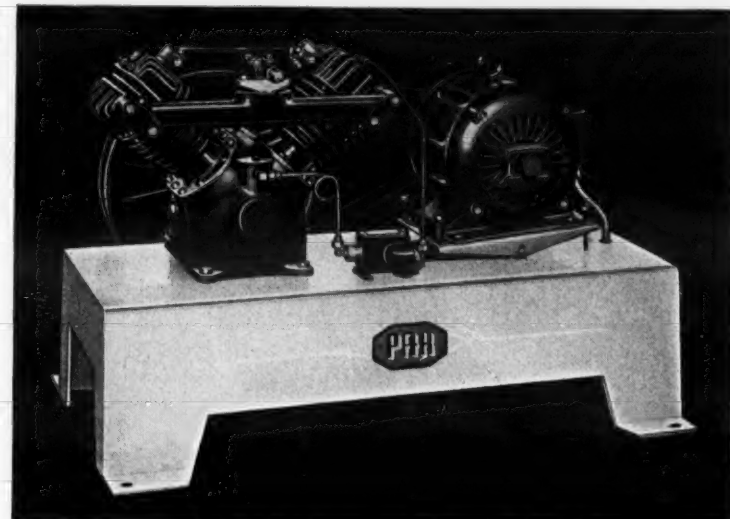
PAR Air-Cooled Highside



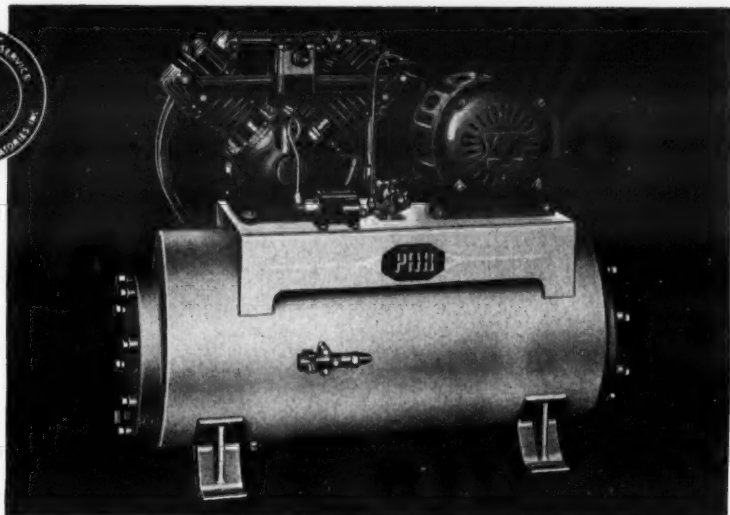
PAR Close-Coupled Unit

# PAR CONDENSING UNITS FOR REFRIGERATION and AIR CONDITIONING

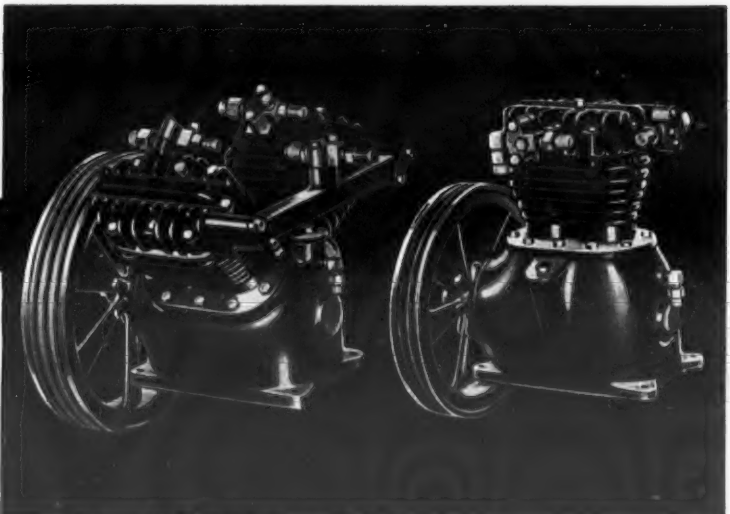
Pick a PAR model for the job at hand. You'll find it designed exactly for that job—that it will provide fine dependability, with plenty of power and capacity to spare. All PAR units are of the large capacity, slow speed type, best suited for long, efficient service. Compressors are crankshaft driven, with three-ring pistons and heavy, hardened crankshafts. Extra fine materials are used throughout. Precision production and careful testing insure peak performance—the kind that pleases customers, and reduces your service expense.



PAR Refrigeration Power Plant



PAR Air Conditioning Highside



PAR Refrigeration Compressors

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PAR's 1939 Catalog "R" contains detailed information on the entire PAR line of refrigeration and air conditioning equipment. There is much information of interest and value.

Your copy is waiting. Furnish your name and address and it will be sent promptly, without charge or obligation. Write today—see how easy it is to "PUT IT UP TO PAR."

## See PAR Units at Your Nearest Jobber:

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Birmingham, Alabama  
Refrigeration Supplies  
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Melchior, Armstrong,  
Dessau Co.  
Buffalo, New York  
Melchior, Armstrong,  
Dessau Co.  
Butte, Montana  
Root, Neal & Company  
Cedar Rapids, Iowa  
Dennis Refrigeration  
Supply Co.

Charleston, West Virginia  
Air Conditioning &  
Refrig. Sup. Inc.  
Charlotte, North Carolina  
Henry V. Dick & Co.  
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Pegler Machinery Co.  
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Cincinnati, Ohio  
Merkel Brothers Co.  
Cleveland, Ohio  
Debes & Co.  
Columbus, Ohio  
Hughes-Peters Electric Co.  
Dallas, Texas  
The Electromotive Corp.  
Davenport, Iowa  
Republic Electric Co.  
Dayton, Ohio  
W. H. Klefaber Co.  
Denver, Colorado  
Refrigeration Parts &  
Supply Co.

Detroit, Michigan  
W. C. DuComb, Inc.  
Young Supply Co.  
Des Moines, Iowa  
Dennis Refrig. Supply Co.  
Flint, Michigan  
Shand Radio Specialties  
Ft. Worth, Texas  
McKinley Refrig. Supply Co.  
Greensboro, North Carolina  
Home Appliance Service Co.  
Harrisburg, Pennsylvania  
Melchior, Armstrong,  
Dessau Co.  
Houston, Texas  
D. C. Lingo Co.  
Indianapolis, Indiana  
F. H. Langsenkamp, Inc.  
Jacksonville, Florida  
The Jamita Co.  
Kansas City, Missouri  
Forslund Pump &  
Machinery Co.  
Los Angeles, California  
Frank Gillett Co.  
Refrigeration Supply Dist.

Louisville, Kentucky  
S. W. H. Supply Co.  
Macon, Georgia  
Lowe Electric Co.  
Madison, Wisconsin  
Refrigeration Specialty Co.  
Memphis, Tennessee  
United Refrigerator  
Supply Co.  
Milwaukee, Wisconsin  
Refrigeration Specialty Co.  
Minneapolis, Minnesota  
Refrigeration & Industrial  
Supply Co.  
Mobile, Alabama  
Harris Fixture Co.  
Montgomery, Alabama  
Teague Hardware Co.  
Nashville, Tennessee  
The Starr Co.  
Newark, New Jersey  
Melchior, Armstrong,  
Dessau Co.  
New York City, New York  
Melchior, Armstrong,  
Dessau Co.

Norfolk, Virginia  
Noland Co.  
Oklahoma City, Oklahoma  
Mideke Supply Co.  
Omaha, Nebraska  
Interstate Machinery &  
Supply Co.  
Peoria, Illinois  
R. E. Thompson Co.  
Philadelphia, Pennsylvania  
Melchior, Armstrong,  
Dessau Co.  
Phoenix, Arizona  
Refrigeration Supply  
Distributors  
Pittsburgh, Pennsylvania  
Melchior, Armstrong,  
Dessau Co.  
Portland, Oregon  
Refrigerative Supply Co.  
Richmond, Virginia  
A. R. Tiller, Inc.  
Rochester, New York  
Melchior, Armstrong,  
Dessau Co.

Sacramento, California  
Hinshaw Supply Co.  
San Francisco, California  
California Refrigerator Co.  
Seattle, Washington  
Refrigerative Supply Co.  
Shreveport, Louisiana  
Interstate Electric Co.  
Sioux City, Iowa  
Dennis Refrig. Supply Co.  
South Bend, Indiana  
F. H. Langsenkamp, Inc.  
Spokane, Washington  
Refrigeration Parts Sup. Co.  
Springfield, Illinois  
Springfield Refrigeration  
Supply Co.  
Springfield, Massachusetts  
Melchior, Armstrong,  
Dessau Co.  
St. Louis, Missouri  
Brass & Copper Sales Co.

Tampa, Florida  
Bowen Refrigeration  
Supplies, Inc.  
Toledo, Ohio  
Heat & Power  
Engineering Co.  
Tulsa, Oklahoma  
Machine Tool & Supply Co.  
Washington, D. C.  
Melchior, Armstrong,  
Dessau Co.  
Waterloo, Iowa  
Winterbottom Supply Co.  
Wichita Falls, Texas  
United Electric Service Co.  
Toronto, Ontario, Canada  
Railway & Engineering  
Specialties, Ltd.  
Montreal, Quebec, Canada  
Railway & Engineering  
Specialties, Ltd.  
Winnipeg, Manitoba, Canada  
Railway & Engineering  
Specialties, Ltd.

EXPORT DEPARTMENT—  
Melchior, Armstrong, Dessau Co.—New York City, New York

# MODERN EQUIPMENT CORPORATION

DEFIANCE, OHIO U.S.A.



## Specialty Selling Methods

### 'Exclusive' Cooking Schools, Two Prospects Per Salesman, Is St. Louis Dealer's Idea

ST. LOUIS—Short, snappy cooking classes, managed entirely by salesmen and limited to two good prospects per salesman . . . this different twist to an old reliable institutional program method steps up sales percentages on both major and small appliances for Brandt Electric Co. here.

This method means bona-fide, product prospects, better concentration of sales appeal, and—most important—actual selling while the cooking class is in progress, the company finds.

Brandt recently built two new planned kitchens in its showrooms at 902 Pine St. in downtown St. Louis, one with all-wood furnishings, the other all-metal, to give prospects their choice of either type without necessity of the company's pushing either one or the other.

#### KITCHENS SPREAD SALES

While they also are used to sell related merchandise, principal reason for the kitchens is to spread sales evenly over the year and playing up everything from wall finish to complete electrical accessories, beginning with a base price of \$200.

R. S. McClure, manager of the division, believes that the two kitchens open up a much wider opportunity for selling the complete kitchen from one store, and designed each kitchen to fit into any home with a variety of prices.

The company's cooking school promotion interlocks with the kitchen sales program, swinging into action with the coming of spring. Each class is concentrated on genuinely "hot" prospects by placing everything, from meal-planning, arrangement, entertainment, to providing the audience, squarely in the hands of the 12 salesmen in the Brandt organization.

#### WHO IS INVITED

The public is not invited. Each salesman can bring only two prospects, who must have been obtained from his canvassing over St. Louis, and be classified as ready to buy at least one of the products that will be demonstrated.

Each salesman is responsible for keeping the "hot prospect" list up to par. If one man can't furnish two prospects who are ready to buy, the store provides him with an extra name or two. In this way, 24 open-to-selling prospects always attend the class—and a much higher percentage of sales result.

Schools are not held regularly—the company feels the best job can be done by waiting until every salesman feels his prospects are ready for the closing effort. So the classes are "spotted" over the spring months—sometimes once a week, more often twice in a three-week period. Before each school, a special sales meeting is held, when salesmen plan the meal, prepare the program continuity, and appoint several of their number as hosts.

#### 'RESERVED' SEATS

An hour and 15 minutes usually is required for the class, with an additional half hour of selling time. At 2 o'clock, the 12 salesmen go after their prospects, drive them to the Brandt building, and make certain

that they are greeted cordially and given special "reserved" seats, one on each side of the salesman who brings them.

This "reservation" principle is a clever touch of psychology which builds valuable advance goodwill, the company has found. Particularly is it valuable in the case of dealers in neighboring communities who send prospects into the school. When a customer comes in perhaps 75 miles to the school and sees his name on the back of a chair, the subtle flattery really means something.

#### SALESMEN TAKE PART

In addition to its own retail work, Brandt also distributes Estate products in some of the small towns around St. Louis, and offers its cooking school plan to all its dealers. About 50 dealers now take advantage of it, doing their own selling but bolstering their efforts with Brandt's expert selling advice.

As soon as the prospect group is assembled, the school gets going. Each salesman has some part in the program, to save time. Shorter programs get better results, too—for the company finds that women don't like to spend a whole afternoon at one of the parties.

#### SELLING ALL THE TIME

Salesmen sell while actual cooking is being done, pointing out steps saved in the kitchen, demonstrating by assisting the cook, and keeping up general explanatory conversation. In this way, prospects don't become restless, and are much more willing to talk prices and terms in the half-hour following the school.

Whole procedure is personalized—salesmen call for their prospects, sit with them during the class, eat with them afterward, and enjoy an after-dinner smoke while clinching the sale. Friendly selling in this fashion accomplishes what no amount of high-pressure work could do—70% of the prospects buy at least one of the products shown at the class.

### Towels and Bathmats Attract Prospects & Provide 'Pin Money'

PONCA CITY, Okla.—Bath towels and major appliances may be queer sale-mates, but the combination has proved a profitable one for Suggs-Maytag Appliance Co. here.

Placed in the store by Mrs. Edwin Suggs, wife of the owner, a nationally advertised line of towels, washcloths, and bathmats has been performing valuable service as a traffic builder and a source of additional revenue.

Women not only purchase the towels as gifts, Mrs. Suggs explains, but they also tend to buy a set for themselves and to finance it concurrently with the appliance on which they are making payments.

As a sideline, Mrs. Suggs says, the towels are more than earning their rent. Besides, she points out, their gay colors and attractive designs have a decided decorative appeal, and so serve admirably to brighten up either store or window displays.

### 'Birthday Parties' To Open Kelvinator's Big Spring Push

DETROIT—Celebrating the silver jubilee of the household electric refrigerator, Kelvinator next month is launching the most intensive spring selling campaign of its 25-year history, reports J. Nelson Stuart, director of advertising and sales promotion.

The campaign, now getting under way with a series of previews of the new "silver jubilee" refrigerators in showrooms in all parts of the country, will be backed by an unusually heavy schedule of newspaper and magazine advertising, Mr. Stuart said.

Major features of the drive will be a nation-wide "birthday party," which will be held simultaneously in thousands of showrooms during the week of April 3; colorful showroom and window displays built about the "silver jubilee" refrigerators are based on the twenty-fifth anniversary celebration; local consumer contests, new "door-opener" ideas and gifts for use of salesmen, a special direct-mail campaign, special broadsides, radio spot announcements, and educational activities of National Salesmen's Institute, in which nearly 2,500 men have already enrolled.

A great amount of store activity also will be built around the silver anniversary theme, says Mr. Stuart. Dealerships in the Kelvinator line-up will appear in special "birthday" dress, with appropriate floor and window displays, product displays, free desserts, and special gifts for showroom visitors and contest drawings on April 8, last day of the nation-wide party.

An entire series of newspaper advertisements, inviting the public to the Kelvinator birthday party, have been prepared for use by retail outlets throughout the country. These advertisements range from full-pages, featuring the birthday party invitation, all the way down to one-column newspaper "spots." National advertising also will carry through the silver jubilee theme.

Correspondence courses of the National Salesmen's Institute have been developed so as to be of maximum help to salesmen in participating with the manifold activities of the spring drive, Mr. Stuart declared.

### Refrigerator Sales Plan Outlined in Dallas

DALLAS, Tex.—Plans for a huge campaign which includes an extensive advertising program to promote the sale of electric refrigerators during the next few months were presented at a meeting of refrigerator dealers and salesmen recently in the Dallas Power & Light building.

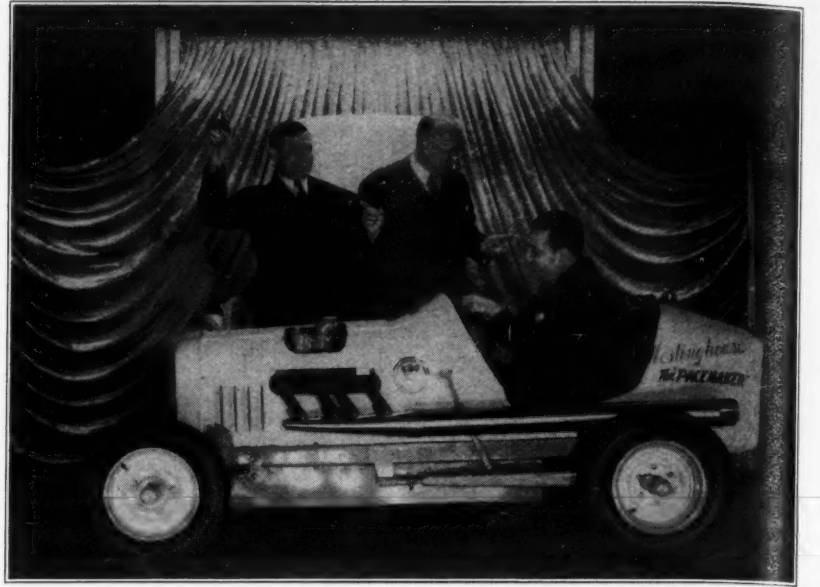
William H. Hanna, field promotion supervisor of the Modern Kitchen Bureau of the Edison Electric Institute, declared that rapid strides had been made in improving electric refrigerators.

"Once a modern electric refrigerator gets into the back door, it becomes the first step toward kitchen modernization," said Mr. Hanna.

#### Wichita Norge Men Meet

WICHITA, Kan. — New Norge products and advertising and sales promotion instructions were given Wichita area dealers at a zone meeting directed by W. C. Rowles, Norge regional manager.

### 'Racing Along' For New Sales Records



Everett Johnson, Westinghouse dealer from Nashua, N. H., is a driver in midget auto races. When he found the Westinghouse line for 1939 was styled "The Pacemaker" he had a "natural" for a tie-in, so he brought his "pacemaker" to the Boston dealer meeting. In the picture

are B. F. Moody, utility manager for Wetmore-Savage, Boston distributor, at the wheel; G. H. MacGilvray, New England district manager in the role of timer; with Jordan Silver, the distributor's merchandise manager, firing the starting shot for a "bigger and better year."

### Building Equipment Line & Appliances Go Well In Selling To Prospective Home Owners

MADISON, Wis.—Are many of your new-appliance customers planning to build new homes or remodel their old ones? Then why not take on a sideline that enables you to get business from them, coming and going? That's what the Endres Electric Co. here has done.

Endres' "sideline" . . . which, incidentally, has meant a good many extra appliance sales . . . is a line of wrought iron fireplace fixtures, porch and stair rails and grilles, and bronze plaques, as well as lighting and church fixtures. In addition to selling them, the company also manufactures several of the products.

Sales of one of the lines has helped build up business for the other, the company has found. Where pros-

pective customers are moving into new homes or modernizing existing ones, the bidding on fixtures opens the way for appliance sales later. If the appliance is purchased first, the way is opened for a sale of iron fixtures that may later be needed.

Iron fixtures sold by the company are of good quality, but are not fancily priced.

An electrical contractor bidding on wiring jobs as well as fixture jobs, Endres finds that the interchange of tips between departments helps increase sales in all of them. Salesmen handling appliances pass on tips to the wrought iron fixture department, and fixture salesmen let regular appliance men "run down" the prospects they come across.

### 11 Manchester Dealers Set Up Kitchen Center

MANCHESTER, N. H.—With 11 local merchants as co-proprietors, a permanent electric kitchen planning center has been opened at 1038 Elm St. here, with approximately 2,000 sq. ft. of space available for exhibits of kitchen equipment.

In addition to the permanent exhibits of the 11 cooperating merchants, the center will contain a model kitchen set-up which will serve as a background for lectures and demonstrations by manufacturers' home economists, cooking classes, and discussions of proper lighting, proper floor coverings, color schemes, labor-saving appliances, and step-saving kitchen arrangements.

Consultants will be maintained at the kitchen center to advise housewives on the general planning of kitchens. Auditorium for lectures and demonstrations will seat 300.

Official opening of the kitchen planning center was held March 2.

Booths of cooperating merchants include electrical equipment such as ranges, refrigerators, dishwashers, waste disposal units, and small kitchen appliances. Special displays will be featured from time to time.

Dealers conducting the kitchen exhibit are: John B. Varick Co., J. J. Moreau & Son, A. L. Franks Co., E. E. Chase Co., Robert Horace, G. F. St. Lawrence & Son, Granite State Electric Supply Co., Public Service Co. of New Hampshire, Manchester Coal & Ice Co., Sears, Roebuck & Co., and Manchester Supply Co.

### Mental Hazards Worst, Kitchen Experts Say

MANSFIELD, Ohio—The "mental hazards" lurking in a poorly planned kitchen exact a far greater toll than do a few extra steps, agreed kitchen planning experts at their fifth annual meeting here under leadership of I. W. Clark, Westinghouse kitchen planning specialist.

Swinging doors, especially where these doors are located near a range, sink, or refrigerator; cupboard doors that can be and usually are left open to become "head" hazards; deep drawers in which scores of articles are accumulated requiring a thorough search before the elusive piece of equipment is found; and many other arrangements found in the average kitchen were condemned.

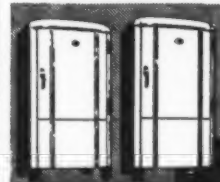
It was also decided that the complete organization of each of the three centers is the most important element in a modern planned kitchen. Complete organization, it was held, results in each center becoming self-contained, so that all of the work pertaining to that center can be accomplished with a minimum of time and steps. Each center, in substance, has its own storage space, auxiliary equipment such as dishes, foods, culinary equipment, as well as the major appliances.

A "set-out" method of installing base cabinets was introduced by Mr. Clark. This method makes possible the lowering of the wall cabinets to within 10 inches of the working surface, eliminating unnecessary and tiresome reaching.

### TWO PROFIT OPPORTUNITIES

**Copeland**  
Household Refrigeration

**Copeland**  
Commercial Refrigeration



Both products of 20 years experience. Both recognized by experts as the "last word" in modern refrigeration—efficient, thrifty, long-lasting. Write today for facts about either or BOTH of these Copeland Profit Opportunities.



COPELAND REFRIGERATION CORPORATION  
Sidney, Ohio

THE NEW  
**BUSH COUNTERFLOW CONDENSERS**  
ARE IDEAL UNITS  
FOR REPLACEMENTS ON WATER COOLED JOBS  
OR  
BOOSTER UNITS ON UNDER CAPACITY AIR COOLED JOBS

WRITE FOR SPECIFICATIONS AND PRICE LIST

**THE BUSH MANUFACTURING COMPANY**  
HARTFORD, CONN.

BRANCH FACTORY  
610 N. OAKLEY BLVD.  
CHICAGO



EXPORT DEPT.  
100 VARICK ST.  
NEW YORK, N.Y.  
CABLE - ARLAB, N. Y.



## Distributor-Dealer Doings

### Wisconsin Association Will Continue Under Present Management

MILWAUKEE — Continuation of the secretary-manager plan of direction for another year was voted by members of the Wisconsin Radio, Refrigeration & Appliance Association at their recent annual meeting.

Under this plan the management of the association is in the hands of H. L. Ashworth, as secretary-manager, with the board of directors acting in an advisory capacity on matters of association policy. The association has no president or vice presidents, and the only continuing office is that of treasurer.

New directors elected at the meeting were Gordon Ische, of Ische Bros.; Clarence Niss, of C. Niss & Son; and Oscar Goelzer, of J. J. Jones Co. Hold-over directors are: Frank W. Greusel, Gordon Fairfield, Henry C. Czech, A. Van Antwerpen, J. A. Taylor, and Al Hass.

In approving continuance of the secretary-manager plan, the meeting also gave approval to the creation of a small advisory committee of four members, upon which the secretary-manager might call for advice and guidance. The board of directors, however, continues as final authority on all association matters.

### 'Rockford Lumber' Now Under New Name

ROCKFORD, Ill.—To define more clearly its functions and to avoid confusion, particularly in the minds of out-of-town dealers, the wholesale appliance division of Rockford Lumber & Fuel Co. has adopted the name of Appliance Merchandisers Co.

The new firm will operate as a subsidiary of Rockford Lumber & Fuel Co., with W. V. Porter as manager and J. A. Kuske as assistant manager. Main office is at 201 E. State St.

The company will continue as distributor in northern Illinois for Frigidaire electric refrigerators, ranges, and water heaters. In addition, it is expanding its activities by taking on distribution of the Bendix home laundry, Sperton radios, and Evanoli circulating heaters, winter air-conditioning systems, and oil-fired water heaters in a territory including parts of Illinois, Wisconsin, and the upper peninsula of Michigan.

To make possible the development of better advertising support for its dealers, the distributing organization has appointed Howard H. Monk & Associates, Rockford advertising agency, to assist with its merchandising activities.

Mr. Porter, general manager of Appliance Merchandisers Co., has since 1933 been manager of the parent company's wholesale appliance division and its subsidiary, Badger Refrigeration & Engineering Co., Milwaukee. Prior to this connection, he was for many years associated with Stover Co., Chicago, and Frigidaire division, General Motors Sales Corp.

J. A. Kuske, assistant to Mr. Porter, also was at one time associated with the Frigidaire organization, but since 1935 he has served as comptroller of Badger Refrigeration & Engineering Co.

Retail appliance division of Rockford Lumber & Fuel Co. will continue under its old name.

### 250 Dealers & Salesmen Attend Norge Meeting

CHARLESTON, W. Va. — The Charleston Electrical Supply Co. last week was host to more than 250 Norge dealers and salesmen who attended the five-day group meeting. Paul Puffer, Norge district manager, and Hugh Walters, Norge national service division, spoke at the meetings, which were primarily devoted to demonstrations of various Norge products. In charge were John T. Morgan, salesmanager, and E. H. Robertson, manager of the Norge division, of the local company.

### Frigidaire Dealers In Georgia Launch Joint 'Cold Wall' Campaign

ATLANTA, Ga.—To acquaint the public with the new 1939 "cold wall" Frigidaire and to stimulate sales, Frigidaire dealers in Georgia have launched a cooperative newspaper advertising campaign in the Atlanta Journal.

The advertisers include Sterchi's, Atlanta; J. E. Varner, Hapeville; Cheney Appliance Co., Atlanta; Davison-Paxon Co., Atlanta; College Park Furniture Co., College Park; King Hardware Co., Atlanta; Bell Appliance Co., Decatur; Southern Appliance Co., Atlanta; Advanced Refrigeration, Inc., and Rich's, Atlanta.

### Kelvinator Line Added By Tiedtke Store

TOLEDO — Tiedtke's department store, a division of the Kobacher Stores, Inc., which is now celebrating its forty-fifth anniversary, is now handling the complete line of Kelvinator electrical appliances in its new and enlarged appliance department, reports O. E. Sells, appliance manager.

Formal presentation of the Kelvinator line was made to the Tiedtke sales organization at a meeting March 6 in the Commodore Perry hotel, by members of the Detroit Kelvinator branch sales organization.

Representatives from Detroit who made the presentation included R. W. Walsh, branch manager; J. W. Taylor, L. E. Walters, and B. G. Beveridge. The meeting was in charge of H. F. Eldt, sales manager of the Detroit branch's Toledo division.

The Kobachers Stores, Inc. control a chain of 13 stores.

### Radio & Motor Service To Distribute Apex

CLEVELAND — Radio & Motor Service Co., Altoona, Pa., has been appointed distributor of the full line of Apex electrical appliances throughout the central part of Pennsylvania. National Mill Supply Co., Fort Wayne, Ind., has been named Apex distributor in the tri-state area consisting of northeastern Indiana, northwestern Ohio, and southern Michigan.

### Craner Separates Retail & Commercial Depts.

LINCOLN, Neb.—G. A. Craner Co., appliance dealership here, is divorcing its retail sales department from its commercial and service departments and is moving these divisions to separate locations in order to provide the additional space required by each branch.

### Southern Electric Will Handle G-E Line

TALLAHASSEE, Fla.—The Southern Electric Co., 212 E. Tennessee, has been appointed a dealer for General Electric home appliances, it was announced here last week.

J. M. Feinberg, head of the recently opened Southern company, declared that a feature of the store will be a kitchen-planning institute, to suggest new kitchens and to help home owners plan remodeling.

### North Bell Hardware Named Dealer By Crosley

DALLAS, Tex.—North Bell Hardware Co. recently announced, in local newspapers, its appointment as dealer for the Crosley line of major appliances. This advertising was accompanied by elaborate displays of the newly acquired line in the store's show windows.

## TWO NEW PHILCO PRODUCTS ... new opportunities to profit with Philco!

*Amazing New* **CONSERVADOR**  
ELECTRIC REFRIGERATOR

**Patented SHELF-LINED INNER DOOR**  
gives 26% more quickly usable space

A refrigerator that *has what it takes to sell!* An amazing new feature—the shelf-lined Inner Door—gives 26% more quickly usable space ... twice the convenience ... the first refrigerator ever built where you *really use*, easily and naturally, *all the space* you buy. In addition, every worth while feature of any good refrigerator.

Get the complete story from your distributor, including details of Philco's big national advertising and merchandising campaign that will bring Conservador Refrigerator buyers to your store! A part of the Philco All Year 'Round plan.



## YORK COOL-WAVE PORTABLE AIR CONDITIONERS

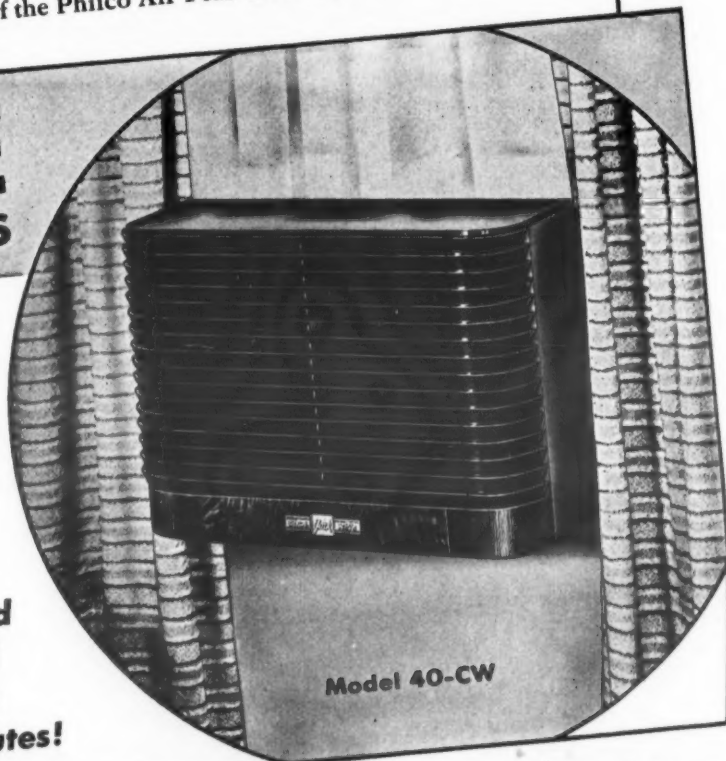
York, leader in air conditioning, and Philco, leader in appliance merchandising, combine to bring you a new business—air conditioning, as low in price and as easy to install as a good radio! Portable, "package unit" air conditioners for every size room—as little as \$150, or \$15 down! Quickly and easily installed ... no wiring, plumbing or technical knowledge needed.

A sensational profit opportunity! NO TRADE-INS ... full profit ... every home and office in your community a live, eager prospect.

Philco backs York Cool-Wave with powerful advertising and merchandising ... a part of the Philco All Year 'Round program.

to sell  
for only  
**\$15**  
DOWN!

Easily installed  
in homes and  
offices in less  
than 30 minutes!



Model 40-CW

For full details  
write, wire or phone your Philco distributor now.  
Or address Philco Radio & Television Corporation, Philadelphia, Pa.



# PHILCO ALL YEAR 'ROUND



## Commercial Refrigeration

### New Peerless Design In Coils Includes Radiant Heat Defroster Means

CHICAGO—Five new products for the 1939 refrigeration market are included in the 72-page catalog recently made available to customers in the industry by Peerless of America, Inc.

While the catalog lists all the company's products and includes considerable engineering data, of particular interest are five new products: a "flash cooler" for walk-in coolers, a low temperature unit with radiant heat defroster, a modifier control, new expansion valves, and the new Peerless "water saver."

New powered "flash cooler" for walk-in cooler applications is a forced air unit having a down draft, in which the cooled airflow is centered in the room, and does not spill directly over products stored along the walls.

The unit is equipped with "Thermek" spined cooling surface, and coils are rifled. In use, the unit is claimed to provide a high humidity in the cooled compartments, resulting in a unit particularly adapted for use in meat markets, vegetable stores, florist shops, and similar places.

#### HOW DEFROSTER WORKS

Low-temperature unit with a radiant heat defroster is a forced-air unit cooler, designed for temperatures down to  $-20^{\circ}$  F. With the radiant heat defroster, it is claimed, generated heat radiates to the cooling surfaces and defrosts them without throwing a large amount of heat into the cooled room.

Heat radiating elements are of the infra-red lamp type, and are said to have a life of approximately 800 hours. In defrosting, all that is necessary is to stop the compressor and fan motors, and then swing the defrosting panel to its upward position. This automatically starts the defrosting current. "Thermek" coils are used in the unit cooler.

#### HUMIDITY 'MODIFIER'

New modifier control is used for seasonal humidity control on unit coolers for walk-in coolers and similar applications. The control has two positions, "summer" and "winter."

When the switch handle is moved to "summer" position, the modifier automatically controls the unit cooler fan motor so that it operates at full speed when the compressor is in operation, and slows down when the compressor shuts off, so that the moisture on the cooling surface is picked up and circulated rather than allowed to be lost.

In "winter" operation, the modifier controls fan speed to slower levels while the compressor is operating, and steps it up when the compressor is off, so that humidity is lowered. Turning the switch to the winter position during week-ends in summer, when heat leakage is relatively low is said to keep meats in better condition.

### Burbank To Represent Kramer In Northeast



LAWRENCE A. BURBANK

TRENTON, N. J.—Lawrence A. Burbank has been appointed New England representative of Trenton Auto Radiator Works, manufacturer of Kramer heating and cooling equipment.

Mr. Burbank worked in the refrigeration testing department of General Electric Co.'s Schenectady plant after graduating from Bliss Electrical Engineering School in Washington, D. C. Later he became New England representative of Alco Valve Co.

New in the Peerless expansion valve line are the models VS, a small thermal expansion valve; V, the standard expansion valve; VN, a non-adjustable expansion valve; VA, an automatic expansion valve; and VT, a constant pressure, two-temperature valve.

Valves VS and V have the new Peerless removable orifice cartridge. These cartridge units are available in nine sizes, depending upon the particular refrigerant and the particular unit B.t.u. capacity on which the valve is to be used. Selection of proper orifice size, it is claimed, permits maximum valve performance at minimum operating cost.

#### 'WATER SAVER' DESIGN

The new Peerless "water saver," type PEC, is of streamline design, and does not employ pump or spray nozzles, lending itself to simplicity of operation with a minimum of maintenance trouble, it is claimed.

Water distribution is accomplished by an improved set of brass slinger discs, running on a separate non-corrosive stainless steel shaft. This shaft, as well as the shaft of the positive type centrifugal blower, is driven by one motor through one V-belt. Motor, belt, and all pulleys are enclosed within the outer casing. Access is provided through several removable panels. Air can be ducted to the unit, as well as away from it. Dimensions are such that the unit can be moved through a 30-inch doorway.

### Quillen Bros. Turns To Distributor Method For Selling Cases

INDIANAPOLIS—After nine years of selling direct to the consumer, Quillen Bros., manufacturer of commercial refrigeration equipment, has switched over to a program of wholesale distribution covering both domestic and export sales.

Started in 1930 with modest capital, the company, owned by Carl and Clarence Quillen concentrated first on local sales and later extended its zone of activities to cover southern Indiana, Kentucky, and Tennessee. Increased volume led to the erection of a modern daylight factory on Lafayette Road here, with present facilities for the delivery of five cases per day and ample room for expansion.

Under the new program, Earl B. Vinson is wholesale manager of the central and southern zone, and Harry I. Chambers, Fort Wayne refrigerating engineer, is wholesale manager of the north central states. Both men plan to give active sales counsel and service to their dealer organization in a direct contact program.

The company manufacturers both single and double-duty display cases, walk-in and reach-in coolers, delicatessen cases, and a line of both wet and dry-storage bottle beverage coolers.

All cases are four-coat porcelain enamel, and are made either self-contained or for remote compressor installation, as may be desired. Walk-in and reach-in units are custom built, present schedule calling for 10-day delivery.

### New Wall Display Cases With Over-Size Coil Marketed By Fogel

PHILADELPHIA — Refrigerated wall display cases built in standard lengths from 6 to 16 feet and equipped with specially designed "over-sized" coils said to assure complete circulation, proper humidity, and constant temperature are now being manufactured by Fogel Refrigerator Co. of this city.

The manufacturer claims that this case has been satisfactorily used to preserve even fresh meats, although the average food merchant probably would not use it for that purpose. Cases can be furnished with glass partitions in the display sections and insulated partitions between the display and storage compartment, if desired.

Overall height of the cases is 81 inches. Width at the top is 25 inches; at the bottom, 34 inches.

Storage compartment is 30 inches high and 27 inches deep, large enough to accommodate whole cases of fruit, if necessary. Storage doors are 23 inches wide and 27 inches high. These doors are all porcelain, with one-piece porcelain lining. They are equipped with heavy-duty chromium-plated forged brass hardware, double air-cushioned rubber gaskets, and stainless steel breaker strips.

The display compartment is furnished with three electro-tinned grid-type adjustable steel shelves and has 40-inch-high triple glazed hard rubber sliding doors and hard rubber jambs.

Exterior and interior of the cases are finished in genuine porcelain.

### MASTERCRAFT ADJUSTABLE PAD AND CARRYING HARNESS

The most efficient and economical equipment made for handling refrigerators safely and without scratching or marring. Pad is separate from harness and both adjustable to all styles and sizes of cabinets.

Efficient, sturdy, easily and quickly applied. Adjustable Pad, \$8.30 each

Adjustable Harness, \$6.00 each

Name of refrigerator attractively lettered on pad at 50¢ extra. f.o.b. Chicago.

Write for folder and prices on pads for refrigerators, washers, ironers, ranges, radios, etc.

Pat. Appl'd for BEARSE MANUFACTURING CO. 3815-3825 Cortland Street, Chicago, Illinois Incorporated 1921

### Restaurants Will Have an Increasing Need For This



The chef in Pohlkotte's restaurant, Yellow Springs, Ohio, opens the door to the low-temperature compartment in a restaurant refrigerator built by Midwest Mfg. Co. and equipped with a special sidewall evaporator by Peerless of America. Quick-frozen foods are kept in the compartment.

### Short-Order Restaurant Solves Problem of Storing Frozen Foods With 'High Temperature' Case

YELLOW SPRINGS, Ohio—The problem of storing frozen foods for short-order restaurant use has been solved for Pohlkotte's restaurant here through installation of a Midwest reach-in refrigerator with a specially designed Peerless freezer compartment which also refrigerates the balance of the cabinet.

The installation was made by H. L. Scott, sales engineer of American Sales Co., Columbus Westinghouse distributor, and the special freezer compartment, which has a capacity of 5 cu. ft., was specially designed for the job by A. F. Hoesel, chief engineer of Peerless of America, in collaboration with Mr. Scott.

Reach-in refrigerator used in the installation is a standard Midwest model, with a gross storage capacity of 48.7 cu. ft. The unit has four service doors, one of the lower compartments being used to house the compressor and the other to provide non-refrigerated dry storage space.

#### HIGH-CLASS PATRONAGE

Pohlkotte's restaurant enjoys a fairly high-class patronage, Mr. Scott says, much of the trade coming from Antioch College, located in Yellow Springs, and the place uses quite a few frozen vegetables, meats, and chickens.

Before the present installation was made, Mr. Pohlkotte kept frozen products in an ice cream cabinet. Because cabinet temperatures were quite low, however, it was found that the food was not in the best condition for immediate use on short orders.

The restaurant's problem, according to Mr. Scott, was to obtain a large compartment, to be maintained at a temperature between 15 and 20°, in which frozen foods could be stored so that they could be thawed out for use readily.

Evaporator in the upper left-hand compartment of the refrigerator is approximately a 23 x 23-inch rectangular box, with an evaporator door which has 1 inch of insulation. Evaporator itself is constructed of heavy brass, with 1/2-inch copper tubing soldered to the side wall.

Exterior surface of the evaporator maintains an average temperature of from 38 to 40° F. within the food storage compartment, and the interior of the evaporator ranges between 15 and 20°. Powering the installation is a 1/2-hp. Westinghouse compressor.

The installation has been in use for several months, Mr. Scott reports, and the restaurant owner has expressed himself as very much pleased with it, since it does exactly the job he wishes done.

#### THAW OUT READILY

Temperature within the frozen storage compartment is not as low as is usually used for the storing of frozen fruits and vegetables, Mr. Scott points out, but Mr. Pohlkotte wanted the foods to be in a condition where they would thaw out readily. So temperatures of 15 to 20° are used instead of the normal 0 to 5° usually employed for frozen food storage.

While he confesses that this is the only installation in his experience in which temperatures so high were desired for frozen food storage, Mr. Scott asserts that arrangements of this kind may prove to be ideal for restaurants or other applications in which the frozen products would normally be stored for only short periods before being used.

### R. E. Ottenheimer Opens Office as Consultant

BALTIMORE—R. E. Ottenheimer, former president of Ottenheimer Bros., Inc., manufacturer of commercial refrigeration equipment, has opened an office in 400 Hearst Tower building here for consulting service on refrigerator and refrigeration equipment design and marketing.

#### "Listen Boss—

Here's How You Can Get TRAINED Men— U.E.I. Free Placement Bureau will put you in touch with a trained, competent worker. U.E.I. trained men have made good as shop mechanics, installers and service men in this industry for 12 years. This service is free to you and prospective employee. Try it. UTILITIES ENGINEERING INSTITUTE 434 N. Wells St. Chicago, Illinois Established 1927 17 West 60th St. New York, N.Y.

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**ANSUL SULPHUR DIOXIDE**

EVERY CYLINDER INDIVIDUALLY ANALYZED

**ANSUL CHEMICAL COMPANY**  
MARINETTE, WISCONSIN

LET YOUR ANSUL JOBBER NEAR YOU SERVE YOU BETTER



## Commercial Refrigeration

### Conversion of Old System Accomplished By Hanging Blower Units From Blocked-Up Bunker

By S. C. Moncher, Peerless of America, Inc.

HOW an old "bunker" type food storage refrigeration system can be blocked up and adapted for a forced-draft cooler system with resultant saving in space and refrigeration capacity has been demonstrated in the installation made for Sailor's Snug Harbor on Staten Island, N. Y.

Sailor's Snug Harbor is an endowed institution which provides a home for aged members of the U. S. Merchant Marine who have served for 10 years or more and have reached the age of 65. It is located on the northwest coast of Staten Island, at the entrance to New York harbor. At present there are close to 800 residents, and the food storage problem is one of considerable magnitude.

The food storage room for the institution is approximately 30 feet wide x 30 feet deep x 12 feet high outside, and is constructed of cork and cement. The outer walls, ceiling, and floor are insulated with 6 inches of corkboard, while partitions of 4-inch corkboard surrounded by 1 inch of concrete divide the room into a number of refrigerated compartments (see Fig. 1).

In 1920 each compartment was equipped with overhead brine coils and insulated bunkers (4-inch corkboard) which occupy the upper 4 feet of the height of the room.

When it was decided to replace the old refrigerating equipment with a more modern plant, the cost of the

removal of the old coils and bunkers turned out to be a considerable item. This problem was solved, however, by a decision to use forced-draft cooling units, and to suspend them directly from the bunkers.

To effect an additional saving, the flues were blocked and insulated, so

Table 1—Food Calculations

Meat Compartment	B.t.u./Hr.
Insulation loss .....	4,500
Product load .....	12,200
Infiltration and usage load .....	2,200
Electric lights and motors .....	3,500
<b>Corned Beef Compartment</b>	
Insulation loss .....	1,350
Product load .....	5,200
Infiltration and usage load .....	1,300
Electric lights and motors .....	800
<b>Fish Compartment</b>	
Insulation loss .....	1,320
Product load .....	1,500
Infiltration and usage load .....	1,250
Electric lights and motors .....	800
<b>Fruit and Vegetable Compartment</b>	
Insulation loss .....	1,050
Product load .....	4,500
Infiltration and usage load .....	1,200
Electric lights and motors .....	800
<b>Butter and Egg Compartment</b>	
Insulation loss .....	1,650
Product load .....	3,800
Infiltration and usage load .....	1,350
Electric lights and motors .....	800

that the need for cooling the upper third of the refrigerator was eliminated. Inasmuch as this portion of

the room has no utility value whatsoever, this saving in both original installation cost and in subsequent power consumption is of particular merit.

The high side equipment consists of one 5-hp. and one 3-hp. compressor with refrigerant cooled heads and remote air-cooled condensers. The condensers are installed facing a window, and discharge the hot air directly into the open, thus preventing an excessive "heating-up" of the compressor room.

Load calculations for the job are given in Table 1.

### 7 New Distributors Named By Lipman

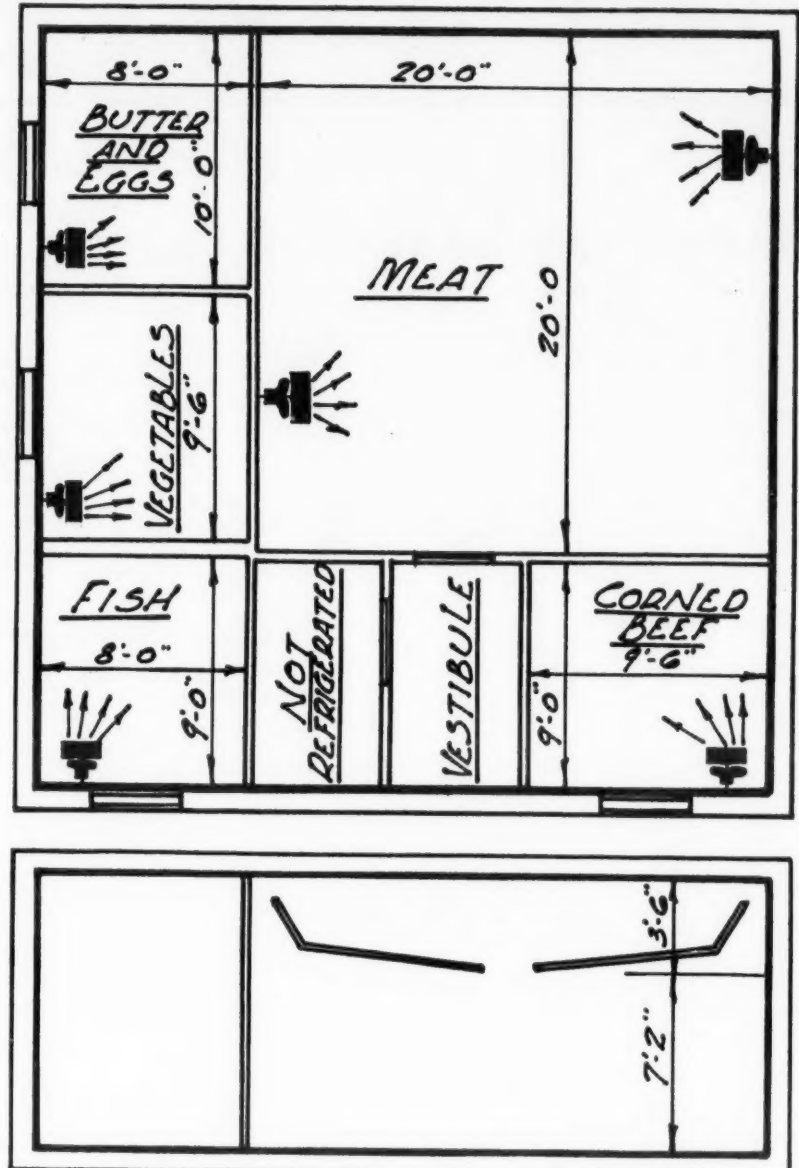
BELOIT, Wis. — Appointment of seven new distributors for Lipman commercial refrigeration and air-conditioning equipment has been announced by General Refrigeration Corp.

The new Lipman outlets are: Jess Bloomfield, Fort Scott, Kan.; Charleston Paper Co., Charleston, S. C.; Essex Market Fixture & Equipment Co., Newark, N. J.; Euth-Lambrecht Co., Detroit; D. O. McCreight, Clarinda, Iowa; L. F. McIrvin, Chillicothe, Miss.; and Modern Homes, Inc., Joliet, Ill.

### New South Bend Dealer To Sell Tyler, Kelvinator

SOUTH BEND, Ind. — Refrigeration Equipment Co. has been formed here to distribute Kelvinator commercial refrigeration equipment and Tyler store fixtures. The new firm is headed by F. A. Funston, who has had 11 years of experience in the commercial refrigeration business. E. E. Ullery is commercial engineer; Frank Krebs, sales manager; and Earl Case, salesman.

Fig. 1—A Food Storage Room For 800 Sailors



(Above) Plan of storage rooms. (Below) Section through room. Blower units were suspended from the old system's bunkers.

# SYLPAK

● In the Imperial Sylpak Valve you get the double security of the Sylphon plus a good spring loaded packing at a cost no greater than ordinary packless valves.

Here is a valve that stays tight under every operating condition. It stands up under pulsations, vibration, excess pressure and can be used with any refrigerant excepting ammonia.

With ordinary valves a certain amount of seepage may take place after the valve becomes slightly worn. The annoyance from fumes as well as the possibility of property damage in certain types of installations, has brought about a very definite demand for a valve that would afford positive protection against such leakage under every operating condition. The Imperial Sylpak entirely eliminates any possibility of such seepage troubles even with the most penetrating types of refrigerants.

Note the sturdy compactness of the Sylpak valve . . . the short husky stainless steel stem . . . the extra large Sylphon that withstood more than 100,000 openings and closings under test in the Underwriters Laboratories.

Since the Sylpak Valve was announced many thousands of them have been installed in every section of the country and have met the exacting requirements of present day standards of air conditioning and refrigeration work.

If you are not using this double security Sylpak Valve we suggest that you specify them on your next order to your jobber.

These valves are available for tube diameters from 1/4" to 3/4" for S.A.E. or solder fittings as desired. Sylphon type valves can also be furnished in sizes up to 1 1/2" female I.P.T. and 1 3/4" O.D. tube size.

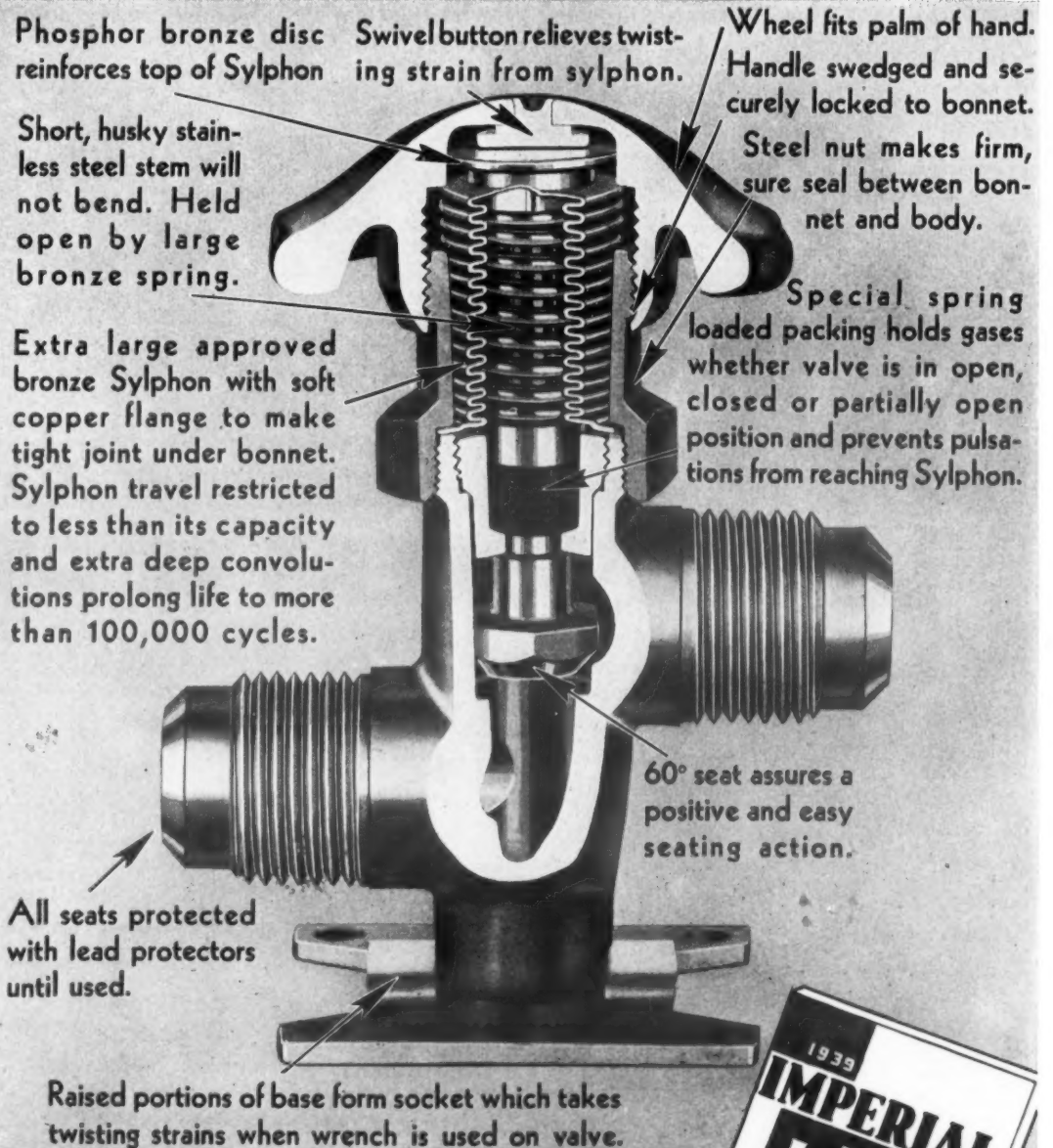
IMPERIAL BRASS MFG. CO., 565 S. Racine Ave., Chicago



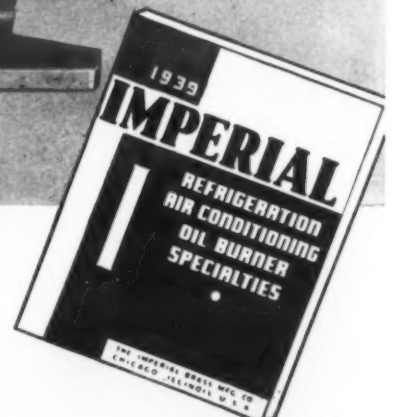
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1939 IMPERIAL CATALOG





# Air Conditioning

## Latest Thinking on Engineering & Installation Methods Revealed at Illinois Conference

(Concluded from Page 1, Column 1)  
the presence of cold surfaces, and the type of work done by the occupants."

Prof. Alonzo P. Kratz: "High and low wall register systems of warm air heating work equally well if both are properly designed."

C. L. Ringquist, the Trane Co.: "Controls have the same relation to an air-conditioning system that the driver does to an automobile."

R. E. Gould, Frigidaire Corp.: "Full advantage of insulation, roof sprays, and awnings should be taken into consideration in computing any cooling load and applying equipment."

### ALUMINUM FOIL

Prof. S. Konzo: "A minimum of two inches of 'fill' insulation is necessary for a 'good' insulating job... a single sheet of reflective type insulation is equivalent to .44-inches of fill type insulation."

L. V. Teesdale, U. S. Department of Agriculture Forest Service, Madison, Wis.: "Homes north of the Ohio river should be equipped with a 'moisture seal' of waterproof material to prevent condensation of moisture in the walls."

### FIRE HAZARD

S. R. Lewis, mechanical engineer, Chicago: "Many types of air filters are fire resistant when new but... any dust loaded filter is a potential fire hazard, as the dust will burn rapidly. Throw-away filters... should be protected by sprinkler heads and devices for stopping fans and closing dampers in the event of fire."

A. C. Willard, president of the university and former head of the College of Engineering, told delegates that the university program of teaching and research is designed to "extend the frontiers of science by examining the elusive and fascinating subject of air conditioning."

President Willard introduced Charles Sheard, director, division of Physics and Biological Research, the Mayo Foundation, Rochester, Minn., who spoke on "Physiological Responses of the Body to Its Environment" at the conference dinner.

Speaking on "Equipment For All-Year Air Conditioning," P. E. Mohn, assistant professor of Mechanical Engineering, touched on all known methods of heating, cooling, ventilating, humidity control, air cleaning by filters and electrostatic precipitation, and odor control by activated carbon.

Prof. D. W. Nelson described "drafts" as "a combination of air movement and temperature which cause discomfort," and pointed out that drafts are usually caused by sitting near windows, open stairways, unused fireplaces, and open doorways.

The speaker recommended a design temperature of 80° F. with a 45 to 50% relative humidity and asserted that the variation from outside temperature should be in accordance with the length of occupancy.

### NEW OUTLETS OKAYED

Anemostats, venturi-flow outlets, special combination lighting fixture grilles, and high wall registers were discussed by Prof. Nelson, who recommended that airflow be held to a limit of 500 to 600 feet per minute from ordinary grilles used in air-cooling work.

Controls are important to air conditioning, said C. L. Ringquist, the Trane Co., because the average air-conditioning system usually operates at only a portion of its full load. Percentage of time when the system is operated at "capacity" were held to be from 35 to 40% in the case of hotels and restaurants to 60% in office buildings, the speaker said.

Prof. Konzo, in discussing the use of insulation in air conditioning, stated that the presence of a "cold wall" in winter makes it necessary to keep the room at a higher temperature to assure human comfort. Specific example given by Prof. Konzo was a room in which wall temperatures were 70° F. and room temperatures 70° F. In the presence of a "cold wall" of 59° F. it would be necessary to raise the air temperature to 72½° F. to maintain the same degree of comfort, Prof. Konzo said.

### WALL CONDENSATION

L. V. Teesdale traced the presence of condensation in the walls of residences, particularly those where an artificial humidity is maintained, to a difference in vapor pressure which exists between the inside and outside of the building. Because of the fact that water vapor always flows to a lower vapor pressure, moisture goes from the inside of a building to the walls when the outside temperature drops and the outdoor vapor pressure is materially lowered.

Results of this condition are spoiled wall paper, staining of painted surfaces, and loose plaster, Mr. Teesdale said. He also believes that many cases of outside paint failure may be traced to this cause. Mr. Teesdale recommended that houses, espe-

cially those north of the Ohio river, which are exposed to severe winter weather, be protected by placing a moisture proof sealer under the lath on the inside of the wall.

Describing the use of cooling towers and evaporative condensers in air-conditioning systems, S. I. Rottmayer, engineering associate of S. R. Lewis, stated that this type of equipment should always be used where water cost and water disposal is a problem.

Commenting on equipment now in the field, Mr. Rottmayer emphasized a new type "counter-flow" cooling tower, which, he said, reduced the drift loss from the customary 5% to practically nothing.

M. L. Enger, dean of the College of Engineering, told conference delegates that since 1903 the Engineering Experiment Station has been adding to knowledge through research, by a long range program employing full time research workers and members of the faculty.

During this period the university has published 310 bulletins, 36 circulars, 12 reprints, and has reported 86 cooperative projects. Nineteen such projects are in operation at the present time, Dean Enger said, made possible by contributions of \$125,000 for the current year.

Publications of the Engineering Experiment Station are sent out free during the first six months after issue to people on the notification list.

## Texas Men Appointed To Air Conditioning Dealers' Council

(Concluded from Page 1, Column 2)  
Co. of Texas; James P. Barnes and W. O. Beeman, The Murray Co., Dallas, Tex.; Howard Lee, McKinley Refrigeration Supply Co., Fort Worth; Paul V. Barman and H. E. Cunningham, Lydick-Barman Co., Fort Worth.

Mr. Mitchell heads one of the largest air-conditioning operations in the Southwest, employing 20 men on a full-time basis in the air-conditioning department of the Straus-Frank Co. at Houston.

The company also is engaged in merchandising air conditioning at San Antonio, Tex., where the Frigidaire line of air conditioning is handled in connection with the distribution of Frigidaire household and commercial equipment. Robert Kotzue is manager of the San Antonio air-conditioning department, and Guy C. Stoltz is chief engineer.

While there is no local air-conditioning association in Houston at the present time, Mr. Mitchell feels that a strong organization will soon be formed, and believes that a national organization will be of great assistance in helping to formulate policies and a program for the local group.

Mr. Keller indicated that other appointments to the temporary council would be made in the near future.

## Three New Carrier Bosses Talk It Over



These men are the new executives in charge of production, finance, and sales for Carrier Corp. The newcomer in the group is Carl A. Ostling (left), who comes to Carrier from General Motors to head up production. He is being welcomed by James Bentley, vice president in charge of finance, and Edward T. Murphy, vice president in charge of marketing.

## Promotion Efforts of Utility Help To Make St. Louis the 'Air-Conditioned City'

(Concluded from Page 1, Column 3)  
productions of exactly what the user said about results obtained from his air-conditioning system.

Headings on each page of the booklet are typical phrases taken from owner's letters. These reveal that by-and-large, St. Louis business men are not only "sold" on air conditioning, but are enthusiastic.

Business men report: "Improvement of Daily Receipts"; "We Can Sell More Merchandise"; "More Than Pays for Itself"; "Air Conditioning Is a Positive Necessity"; "Best Investment That We Have Ever Made"; "A Good Business Getter"; "Puts Off Apartment Obsolescence"; "Improved Our Business 40%"; and many similar reactions.

In addition to sales literature mailed to prospects and direct canvass by trained engineers, the Union Electric Co. advertises air conditioning in newspapers over the signature, "Air Conditioning Bureau of St. Louis in cooperation with the Union Electric Co."

The company maintains a display of floor and window type room coolers, attic fans, and other accessories used in air-conditioning installations. Scale model homes show prospects how insulation is used, and its effect on the cooling load. All of the manufacturers selling room coolers in St. Louis have display units on this floor.

Sales engineers in Mr. Freund's department canvass the entire St. Louis area in search of air-conditioning prospects. In many instances these men are "on the job," long before any dealer or distributor has heard about the prospect. These men "sell" the idea of air conditioning to the prospect and after he is "sold" on the idea he is qualified and then asked who he would like to have bid on the job.

"Usually," Mr. Freund states, "the prospect knows some one in the business and wants them to figure

the job. If not, we give him a list of all the people in the air-conditioning business here and let him select his own bidders."

"We never put competition on a job; nor do we do any consulting engineering. When inquiries are made by dealers and contractors relative to power service in a certain building, this information is kept confidential and never passed around."

"In qualifying the job we tell the customer approximately how many tons of refrigeration are required, and will tell him what is wrong with any given bid, if it is necessary to do so. Sometimes it is necessary for us to arbitrate between dealers in case of disputes, but we maintain friendly relations with everyone in the business here, so have no trouble in this respect."

"We try to help the industry as much as we can, at the same time keeping in the background, and making no attempt to control or dominate it. This policy has been successful for a number of years," Mr. Freund asserts.

The Union Electric Co. building is now completely air conditioned; the system extending to all offices, display rooms, and public rooms in the building.

## Conditioning Expected To Increase Bus Travel

CHICAGO—Greater use of air-conditioned buses and Diesel powered fleets are expected to sell the idea of bus travel to the many thousands who will travel this year to the nation's two world fairs and to other heavily advertised resort sections of the country.

Taking advantage of the fairs and other attractions that have sold the idea of travel in general, the bus companies are adding the special advantages of air conditioning and Diesel power to the special excursion rates, which in many cases include visits to both world fairs.

A concentrated advertising campaign conducted by National Trailways System, an association representing 37 major bus lines, will include insertions in six national magazines and a number of teachers' publications. Advertising campaigns of several individual companies have also been substantially increased to sell the idea of bus travel.

First user of Diesel powered buses for commercial use is said to be the Burlington Transportation Co. This company has ordered 21 buses from General Motors.

## 5 EASY STEPS TO PEAK VALVE PERFORMANCE

1

REFRIGERATION PARTS and SUPPLIES

See YOUR JOBBER

2

SPORLAN Valves

Ask him for the New 1939 SPORLAN CATALOG

3

Select the SPORLAN THERMOSTATIC EXPANSION VALVE THAT HAS THE proper charge for your job

4

SPORLAN Valves

Notice that the Sporlan Valve you buy is sealed in the new black and white Sporlan container especially for your protection.

5

Then install the valve on your job and forget it...for you can be confident that SPORLAN CONTROLLED PERFORMANCE VALVES will give you Peak Performance on all installations

**SPOEHRER-LANGE COMPANY**  
3725 COMMONWEALTH AVENUE • ST. LOUIS, MO.

**KERO TEST**

Valves and Fittings

The Standard of the Industry

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**SERVEL**

COMMERCIAL REFRIGERATION AND AIR CONDITIONING

Whether you need 6 machines or 6,000, Servel's engineers and staff will give you prompt, expert service. Write for details to Servel, Inc., Electric Refrigeration and Air Conditioning Division, Evansville, Indiana.



# Major Appliances

## Edison Institute Will Discuss Sales Plans

(Concluded from Page 1, Column 4)

session with a review of "A New Standard of Electrical Living."

Bernard F. Weadock, managing director of Edison Electric Institute, will be the speaker at a formal luncheon that noon.

Modern kitchen merchandising will be the topic of the Wednesday afternoon session, with R. C. McFadden, new business manager of Southern California Edison Co., Los Angeles, opening with an outline of "Load Building with Kitchen Equipment."

"The Range Campaign of 1939" will be explained by J. R. Poteat, of General Electric Co., and that newcomer, "Roasters, the Big News," will be considered by R. M. Oliver, of the Westinghouse Electric & Mfg. Co.

Utility representatives from various sections of the country will take center-stage to tell of some of their 1938 local kitchen campaigns that were profitable, and Dr. G. W. Allison, of Modern Kitchen Bureau, will wind up the session with an explanation of why "We Can Be Optimistic."

At the morning session of Thursday, March 23, advertising and air conditioning share the program. "Fitting Advertising Into the Merchandising Plan" will be discussed by J. R. Pershall, advertising and merchandise sales manager of Public Service Co. of Northern Illinois, while "The Human Appeal in Advertising" will be a round-table discussion subject.

Dr. Albert G. Young, medical director of Corey Hill Hospital, Brookline, Mass., will tell utility men something about "The Public Health Aspects of Air Conditioning."

The better light-better sight program will occupy the entire session on the afternoon of Tuesday, March 21, while general operating methods will be taken up at the meeting on the forenoon of that day.

Of interest at this latter session is a talk on "Some Problems and Opportunities in the Rural Market" by Grover C. Neff, president of Wisconsin Power & Light Co.

## Magee Resigns as Schuster Manager

MILWAUKEE—Thomas P. Magee, manager of the major appliance department for the three Ed. Schuster & Co. department stores here, has resigned effective March 25. No successor has as yet been named, and Mr. Magee's future plans are unknown.

Mr. Magee came to Schuster's five years ago from the Kresge department store, Newark, N. J., where he was associate buyer of housewares for two years. Previously he had been assistant merchandise manager in the home furnishings division of Gimbel's, Philadelphia.

## Abraham & Straus Store Names Reinherz

NEW YORK CITY—Stanley Reinherz has been named assistant manager of the major appliances department of Abraham & Straus department store, to succeed Bernard Zients, who last week was named manager of the major appliances department of Associated Merchandising Corp.

Mr. Reinherz formerly was assistant buyer of the drapery department of Abraham & Straus, and prior to that was with Sears, Roebuck & Co. for a number of years.

## C. I. T. Opens Office in New London

NEW LONDON, Conn.—C. I. T. Corp. has opened a new office here under the supervision of H. E. Doyle, formerly with the Providence, R. I. office of the finance company.

The New London territory had been served by the Hartford, Conn. branch of the firm for several years.

## 'A Heat For Every Cooking Need' G-E Range Feature

CLEVELAND—Use of five-heat Calrod units to cover all cooking requirements, both on surface burners and in the oven, is a new development in electric cookery featured by General Electric in its line of electric ranges for 1939.

By incorporating the five-heat high-speed Calrod units with ribbon-type flattened top surface in the surface cooking area of the new ranges, a heat is offered for every cooking need, from super-speed to simmer, it is claimed. Six-quart "thrift cooker" employs a three-heat type of unit.

Each surface unit in the new ranges is equipped with a "Tel-a-cook" light signal, in a panel directly above the switch, and each of the five heats for each unit has a color signal of its own. This indicates not only what unit is being used, but also what heat is being employed.

With the switch in first position for fast starting, the panel shows red; in second position, for boiling or deep-fat frying, the color is yellow; in third position, for rolling boil, the indicator is purple; in fourth position, a gentle steaming heat, the color is green; in the fifth position, where foods may be kept without danger of burning, the indicator shows blue.

### COLORS INDICATE HEATS

Choice of colors to indicate heats—from hottest "red" to cold "blue," makes it easy for the housewife to remember what speed she is using. Range nameplate, located with switches on the backsplash, is also illuminated, and lights up when the warming unit is on; a second light winks out when the oven reaches the desired temperature.

Oven of the range has its own "Tel-a-cook" light system, with indicator above the switch. On each of the five oven heating applications, a different lighting combination is effected.

In addition to the usual pre-heat, bake, and broil, twin-unit oven of the new range has two other adjustments, and the five stages are controlled by a single switch.

### TWO OTHER ADJUSTMENTS

"Pre-heat," with both upper and lower units on full, is for biscuits baked from a cold start or roasting; "Bake one," with full lower unit and gentle heat from the upper unit, is employed for most baking or roasting; "Bake two" employs only the lower unit, and is for capacity bakings; "Broil one" uses the full upper unit for speed broiling; "Broil two," an economy application for foods that require longer time, uses only part of the upper unit.

Triple-oven arrangement adds to the flexibility afforded by the five available heats. Lower heating unit is moved to center guides, cutting the size of the oven in half, and an aluminum "economizer" sheet is placed underneath. Pre-heating to 400° F. in five and a half minutes, the speed oven can be used for two 9-inch pies, cookies, biscuits, or a complete oven meal.

Master oven, with unit in place at the bottom for capacity oven cookery, affords ample room for two 15-lb. turkeys, a large ham, or an oven meal for 12 people. It has been scientifically designed with accurate thermostatic control and even distribution of heat, with the concentric heat equalizer on the lower unit, for use with cold or pre-heated start.

### SUPER-BROILER

A super-broiler completes the triple oven. Duplex broiling unit has a stainless steel plate which directs radiant heat downward. Oven shelves give three broiling positions at each shelf support, which combine with the two broiling positions on the master switch to afford flexibility for every operation.

Temperature dial for oven-setting is located on the switch panel of the range. The no-stain vent in the center of the top surface maintains the proper humidity in the oven but

keeps the kitchen wall clean because of its location. All shelf supports are streamlined, and oven corners rounded for easy cleaning.

Shelves are of the sliding lock-stop type, both adjustable and one of them reversible. They afford 12 different shelf heights. The oven is heavily insulated on all six sides.

Warming drawer also has a thermostatically controlled Calrod unit.

## G-E Increases Capacity Of Waste Disposal Unit

New G-E kitchen waste disposal unit is said to have three times the capacity of the original model, and increased speed and safety factors.

Redesigned to take advantage of new materials, the new device has eliminated the need for a control handle on the front of the sink cabinet, and is operated by a control fitting in the sink flange, making it impossible for the shredding of waste material to proceed while the container is open from above.

The new Disposall, designated Type FA-2, is unchanged in its principle of operation.

The control is a metal sink stopper serving three functions. It acts as an ordinary stopper when turned to "seal" position, to fill the sink with water. It acts as a removable cover for the Disposall in loading with food waste when turned to the "remove" position. As a safety device, in the "on" position, it locks automatically in place over the shredding compartment and starts the motor.

Shredding compartment of the new unit is of die-cast Zamac, an alloy. It is securely clamped to the sink drain.

## Standard Electric Range Line Is All-Porcelain

TOLEDO—All models in the line of electric ranges being offered this year by Standard Electric Corp. are all-porcelain models and all have four surface units and are equipped with a 5-heat switch.

Price range is from \$125 to \$200 for the models in the regular line, which are named the "Chief," "Superchief," "Zephyr," "Mercury," and "Streamliner."

Of the four surface units with which all models are equipped, two are 1,200 watt units and two are 2,000 watt units. Another feature of the "Standard" ranges this year is an electric light in the oven compartment.

No "well cooker" unit is provided, the argument of Standard officials being that a maximum of surface units should be provided.

In addition to the regular line, two special apartment house models have also been introduced.

## Spurrier's Host To Crosley Dealers At Showing Of '39 Models

TULSA, Okla.—Spurrier's Inc., Crosley distributor, was host to one of the largest gatherings of household appliance dealers brought together thus far this year in this city, at the showing of the new 1939 line of Crosley refrigerators, radios, ranges, washers, Nu-Air coolers, and Royal air cleaners.

## Apex Line of 2 Models Is Priced Low

CLEVELAND—Priced just under \$140 is the 6.2-cu. ft. unit in Apex Electrical Mfg. Co.'s two-model electric refrigerator line for 1939. The unit carries a list price of \$139.95, it was announced.

Other model in the line, of 5.3-cu. ft. capacity, retails at \$129.95. Prices apply to all parts of the country except the far western zone, where they are listed slightly higher.

Both units have exterior finishes of Dulux and interiors of porcelain enamel, are insulated with Balsam Wool, have interior light, and are equipped with a double-width freezing compartment. Of simple design, models have a slightly convex door divided in half with a horizontal chrome bar, which runs through the nameplate and under the chrome bar door handle.

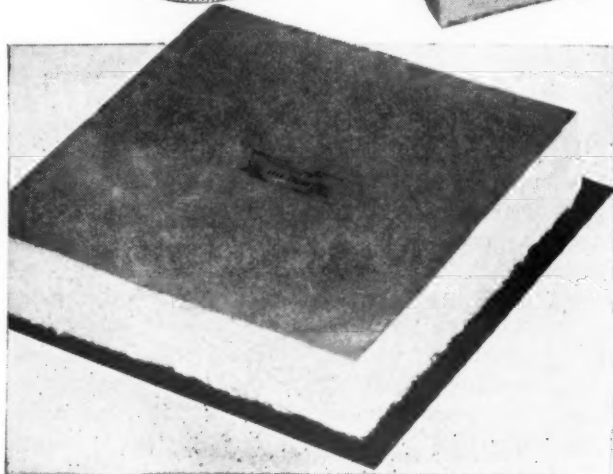
The 6.2-cu. ft. unit has a shelf area of 12.3 sq. ft. and is equipped with four single and one double ice cube trays, freezing 126 cubes or 8.8 lbs. per freezing. Compressor is of single-cylinder type on conventional models, with a twin-cylinder unit and accessory set (meat preserver, vegetable crispers) available at extra cost.

Smaller model of 5.3 cu. ft. has a shelf area of 10.6 sq. ft., two single and one double ice cube trays, with a capacity of 84 cubes or 6 lbs. of ice per freezing, and single-cylinder compressor standard. Twin-cylinder unit and accessory set also are available on this model, if desired, it was said.

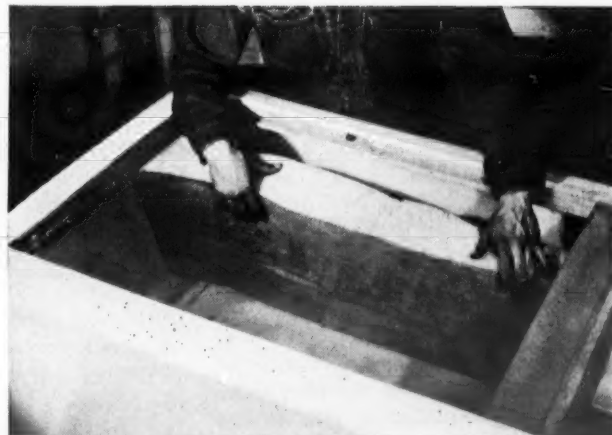
# Improved Insulation

## 3 new advantages

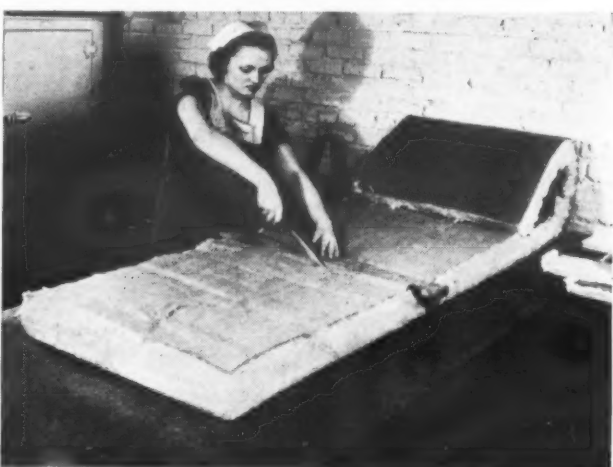
## LOWERS COST CUTS ON THE JOB SAVES ASSEMBLY TIME



**Lower Cost:** Bound-Batt Insulation provides peak efficiency at a remarkable, new low cost. It can be furnished fabricated to specifications, with exclusive Dry-Zero sealing flange.

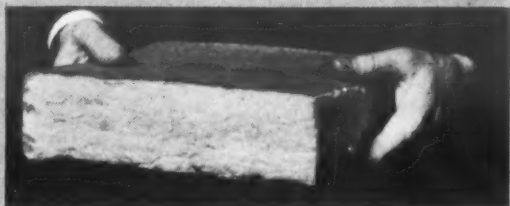


**Easy Handling:** Bound-Batt lessens assembly time because it is stiff enough to handle, and because it is flexible enough to fit irregular contours.



**Cuts Easily:** Standard rolls may be kept in stock and cut to proper sizes with a butcher knife. This means economy of time and material on low production schedules.

## Get the Facts about This Money-Saving Insulation



Free engineering service is available in applying the new Bound-Batt to insulation problems. Manufacturers are invited to submit their problems without obligation. Address: Engineering Department, Dry-Zero Corporation.

The most efficient commercial insulant known

## DRY-ZERO Bound-Batt Insulation

Dry-Zero Corporation  
Chicago: 222 North Bank Drive  
New York: 60 East 42nd Street



## AIR CONDITIONING & REFRIGERATION NEWS

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## Science vs. Practice In Air Conditioning

PRESIDENT Arthur Cutts Willard of the University of Illinois labeled air conditioning a "fascinating but elusive subject" at the conference on air conditioning conducted by the department of mechanical engineering and the engineering experiment station at his institution of higher learning last week. And that just about summed up the results of two days of conferring. It would have been difficult to set up 10 conclusions on which a majority of those present would have agreed.

Although the lines of cleavage were not sharply drawn, it was notable that many of the statements made by professional engineers and academic researchers at the conference were challenged by local contractors and installers who were present, and vice versa.

### Difficult To Establish Incontrovertible Principles

It would appear that (1) the science of air conditioning is still a long way from the establishment of a body of accepted principles; and (2) a wide gulf still exists between the drafting board and the mathematical equation on one hand, and the abilities of the installer and the comfort of the user on the other.

An example of the type of argument which took place at this conference was the debate over the comparative merits of high and low wall registers. One speaker, a professor, advocated high velocity high registers. He was immediately bombarded from the floor by contractors, who offered all sorts of objections.

### Experiences Vary With Different Contractors

The objectors, in turn, were answered by other contractors and installers, who had had favorable experience with high velocity. Other professors joined the fray.

About the only conclusion an innocent bystander could draw was that the idea was probably pretty good if the installation were perfect and the outside conditions favorable.

Perhaps the most significant statement made at the conference was a declaration by Dr. Charles Sheard, director of physics and biophysical research at the Mayo Foundation and Mayo Clinic, Rochester, Minn. Dr. Sheard contended that humidity is fairly unimportant to human comfort up to the perspiration point.

### Relative Humidity Control May Be Unimportant

After the perspiration point is reached, of course, it is essential that humidities be reduced; otherwise perspiration will not be drawn off into the air, and discomfort will be considerable. But at temperatures below the perspiration point, Dr. Sheard's extensive tests of the reactions of the human body show, changes in humidity cause scarcely any reaction on the skin.

In other words, attempts to reach hair's-breadth controls on relative humidity are largely unnecessary and expensive effort, according to his research. The humidity range can vary from 20 to 80%, in his opinion, without appreciable effect on the human body.

### Conditioning For Comfort Can Be Over-Engineered

The Mayo Clinic's research director thus adds more weight to current contentions that air conditioning has been over-engineered in the past—at least, as regards human comfort.

Reproducing a set of laboratory conditions for industrial applications was air conditioning's first task. The same meticulously scientific principles have been carried over into air conditioning for human comfort, with the unfortunate results that (1) the humans were uncomfortable and (2) the installations were so expensive they discouraged prospective purchasers.

### Field Installers Difficult To Direct & Control

One of the chief difficulties, of course, has been the training of hundreds of contractors to do a letter-perfect installation job. So long as air-conditioning installations were limited to those which could be installed by factory experts, conditions laid down by the laboratory scientists could be approximated. But the introduction of union labor and practical contractors into the field changed the situation and the results.

For example: the blueprints might call for a dozen grilles of varying sizes for different spots in the installation. The contractor happened to have on hand a dozen grilles of one size. In they would go; and thus the whole set of equations would be thrown out of kilter.

### 'Future of Air Conditioning Lies In Package Field'

It still seems to a good many observers that more engineering in the product and less in the installation will solve many of the air-conditioning industry's ills. This is, of course, much easier said than done; yet it offers a challenge to the industry which the industry can ill afford to ignore.

As S. E. Lauer, York's vice president in charge of sales, said a fortnight ago: "The future of air conditioning is in the package equipment field."

## They'll Do It Every Time . . . By Jimmy Hatlo



## Radio Production, Prices & Taxes

SIGNIFICANT and interesting figures are contained in the nineteenth annual report to stockholders of the Radio Corp. of America. First of all, it was noted that total radio sales in 1938 declined 34% from the previous year's figure. Next, it was pointed out that the National Broadcasting Co., an RCA subsidiary, enjoyed a 4% increase in its volume of sales to advertising clients.

After disposing of those overall figures, the report goes ahead to observe that in 1938 the industry's average prices of radio sets and of tubes were, respectively, 73% and 50% less than they were in 1929. (And the contrast between the performance of 1929 and 1938 sets is little short of amazing, as almost anyone can testify.)

### Higher Wages, Shorter Hours, More Employees

Yet, since 1929, wages have gone higher, working hours become shorter, and taxes have soared. As an illustration, the average wage rate paid to employees in RCA plants is now more than 15% higher than it was in 1929. Yet the RCA organization has more employees at work now than it had at the close of the year 1929. At that time there were 18,020 employees, whereas at the end of 1938 there were 19,177.

These shorter working hours, higher wages, and increased employment for labor, with lower prices to consumers, is a combination which has been achieved in the face of a general decline in the nation's business—plus increased tax burdens. Such as:

### They Work Harder But Make Less Money

In 1929 RCA earned \$10.27 on each hundred dollars of gross income. Out of this figure they paid taxes of \$1.55 and had \$8.72 left.

In 1938 RCA earned \$11.57 on each hundred dollars of gross income, paid \$4.15 in taxes, and had \$7.42 left.

Direct taxes paid or accrued in 1938 amounted to \$4,154,024, and were equivalent to nearly 30 cents

on each share of common stock. Dividends paid on common stock during the same year amounted to 20 cents a share.

In addition, the company paid Federal excise taxes amounting to \$1,320,027 on radio products sold and radio messages transmitted.

### Who the Capitalists Really Are

An interesting picture of capitalism and capitalists is projected by an analysis of the widespread ownership of RCA. Nearly half of all RCA stockholders are women. Nearly 35,000 stockholders own only one share each (shares are currently quoted at less than eight dollars). More than half own 10 shares or less.

Only one out of every 10 stockholders owns as many as a hundred shares. No individual stockholder of record owns as much as one-half of 1% of the company.

That's the story of American business: better and better products at lower and lower prices, made by labor working shorter hours at increased wages, and ownership spread among thousands of very small investors. And what's the reward of American business for such increased efficiency, better service, and attention to the public welfare? All together, class: "The taxes go up, and Up, and UP!"

## LETTERS

### Frozen Malted Milk

George F. Dent  
Kelvinator Distributor  
408 Center Ave., Bay City, Mich.  
Gentlemen:

In looking over an old copy of the REFRIGERATION NEWS, dated March 23, 1938, I notice an article pertaining to a Malted Milk Machine. The unit is manufactured by the Frozen Malted Machine Co., New York. The article indicates that the price of this unit is \$150 to \$200.

We are interested in obtaining further information pertaining to this piece of equipment. If your records would show the correct address of this company, we would appreciate receiving this information, so that we may in turn correspond with the company to obtain such information and prices as we may need.

CHARLIE PIERCE  
Answer: A notice was published in the Oct. 12, 1938 issue warning readers that the Frozen Malted Machine Corp. had moved from 43 E. 20th St., New York City and left no forwarding address. This company turned up

later at 30 E. 23rd St. but mail was again returned by the postoffice marked "Removed—left no address." On Jan. 4, 1939 the business was sold at public auction.

Literature describing the same machine and using identical installation pictures has just been received from Florida Froster Machine Co., Inc., 940 N. W. Fifth Ave., Miami, Fla.

### Viewpoint on England

106a Lee Road  
Blackheath  
London, S.E.3, England

Editor:  
In response to your request for information about the refrigeration and air-conditioning markets in Europe, I might say that as I have been here for months only, I am not yet authorized as judge of the actual situation in England. Conditions are different in every country, especially on account of the different view which has to be respected.

English people are known for their conservatism, which is the expression much more of saturation than of lack of development. In this line, is no resemblance to any other country. New inventions are accepted as far as their influence is regarded as improvement, not on account of their novelty alone.

This may be the reason why the air-conditioning industry follows another line here than elsewhere.

English people do not live in the city but in the country. Such are also the suburbs of London. Everybody is somewhat a home farmer and adherent to natural life. Everybody who comes here admires the modesty and the tolerance toward persons and conditions, though they may not be desirable.

The saturation point of household refrigeration and air conditioning will, therefore, be far from 100% of the wired homes.

The industry, however, opens a wide field for refrigeration as well as for air conditioning. Economy, quality of the product, and safety of the work are leading factors, and every help in this line will be welcome.

There is a strong industry existing and developing to fulfill the requirements of the industry, though the progress of the United States and other countries is highly appreciated.  
M. HIRSCH

### Specifications Will Be Published March 29

Fowler Brothers  
418 Gay St., Knoxville, Tenn.

Sirs:  
Please mail us C.O.D. as soon as possible, 10 copies of the 1939 Specifications of household electric refrigerators.

PAUL R. DAVIS,  
Mgr., Appliance Department  
Answer: See below.

The Pixley Electric Supply Co.  
Wholesalers of Electrical  
Merchandise Supplies and Equipment  
133 E. Chestnut St., Columbus, Ohio  
Sirs:

Kindly send us 100 copies of your 1939 issue which cover 1939 specifications of household models.

DAN F. McGRATH  
Answer: Specifications of all leading makes of household electric refrigerators will be published in a supplement (size 8 1/2 x 11 inches) to the March 29 issue of AIR CONDITIONING & REFRIGERATION NEWS.



# Major Appliances

## Kitchen Bureau Campaign Gives Dealers Proof That 'Electric Cold' Is Cheaper

(Concluded from Page 1, Column 5) electric, gas, and ice refrigerators went into the test rooms, to be studied under identical conditions. The temperature control room was a regular padded cell, surrounded on all sides by thick insulation.

Inside the room, resistance thermometers were placed at carefully measured points. Electric wires led to the outside control board, on which instruments indicated every variation, of the slightest amount. Thermometers were placed in the middle of the room, near the ceiling, at the sides, and at several points inside each refrigerator.

Test room doors were closed and padlocked so that there could be no tampering with the experiment, which went on for six weeks. Each refrigerator was kept in the test room for 48 hours at 70°; for 48 hours at 90°; and for 48 hours at 110°. Temperatures were electrically recorded at 10-minute intervals.

### CHECKED FOR ACCURACY

Every ounce of ice, every cubic inch of gas, every second of electrical input was measured, checked, and rechecked to insure absolute accuracy. Those six weeks of complete and exhaustive experiments produced irrefutable results. They showed conclusively that modern electric refrigerators cost less to operate than any other kind.

To get across this selling story of electric-cold's economy over all other types, Modern Kitchen Bureau uses the "Scotch Eskimo," an amusing trade character who appears in all newspaper advertising, as a large window and store display, and throughout all other campaign material.

In addition to the series of six newspaper insertions, the campaign includes a food store promotion, large window and wall banners, consumer folders, sales training booklets, and other collateral material. All of them pound home the "so safe . . . so swift . . . so simple" theme, telling how electric refrigerators cost less to run, freeze ice faster, and require only plugging in to be in operation.

### FOOD STORE PROMOTION

The food store promotion is designed to impress upon the public the overwhelming acceptance of electric cold in the commercial field. Teasing-in with the food store promotion advertisement are placards which repeat the message, "the food you buy here is kept safe in an electric refrigerator."

Local food store operators usually are more than glad to tie in with the campaign, since it associates them indirectly with the newspaper advertising in the drive, the bureau states. Supplying salesmen with a reprint of the advertisement also gives an added sales punch to the promotion.

### DISPLAY CONTEST SUGGESTED

Wall posters, window banners, and cutouts also help the "Scotch Eskimo" theme. In the New York City drive, a window display contest with a few small cash prizes stimulated wide interest. So popular were the Scotch Eskimos that they were kept in dealers' windows long after the campaign had closed.

The consumer folder, "Here's Why 11 Million Women Prefer Modern Electric Cold," summarizes the same

story as told in newspaper advertisements, and can be used as counter give-away, envelope enclosure, and in making sales calls.

Sales-training pamphlet is titled "The Mysterious Case of the Scotch Eskimo," and shows Sherlock Holmes and Dr. Watson eavesdropping on a successful salesman, and discovering the technique he employs in telling the story of electric-cold's advantages before he starts selling his own particular brand of refrigerator.

Suggested for inaugurating local campaigns is a dealer mass meeting, as a means of getting the promotion off in high gear. In New York City last spring, the audience packed the Center theater in Radio City. Transcripts of the program are available for local use. Projector slides for showing the "The Cost of Operation" story and tests also may be had on a loan basis.

Weekly breakfast meetings, the bureau suggests, are an excellent means of stimulating interest and effort in the drive on the part of dealers and salesmen. At such meetings, inspirational speakers may be heard, round table discussions held, and contest prizes awarded.

### PRIZES FOR SALESMEN

A "Sweepstakes Contest" featured the 1938 campaign, and was highly successful. One sweepstakes ticket was awarded the salesman for each refrigerator sold and delivered. Weekly drawings for prizes were held, with only sales made that week being eligible. At the end of the campaign a grand prize drawing was held, all tickets being eligible for the 30 cash awards made at that time.

Requests for local adaptations of the drive this year indicate a greatly revived interest in refrigerator selling, says H. L. Martin, bureau manager. More than 100 utilities in all parts of the country have asked for information and materials.

First local campaign making use of the MKB materials is scheduled to start March 15 under sponsorship of the Western Massachusetts Electric Co., Greenfield; the United Electric Light Co., Springfield; and the Pittsfield Electric Co. More than 300 dealers served by 14 distributors will be represented in the drive.

## 'Scotch Eskimo' In First Invasion of the South

BIRMINGHAM, Ala.—The "Scotch-Eskimo" has gone south. The figure symbolizing the economy and food preservation ability of modern electric refrigeration, used successfully by New York distributors, has been adopted for a two-month dealer-utility drive which started here March 1.

"As thrifty as a Scotchman, as cold as an Arctic night" is the theme backing up the "Scotch-Eskimo" trademark, and dealer advertising is stressing refrigerators' new low cost and economy of operation. Birmingham Electric Co. is plugging the drive in all its advertising, referring prospects to their dealers.

To assist dealers in canvassing work, the utility has prepared special lists of customers whose monthly use of electricity averages between 15 and 50 kwh., indicating that there is no electric refrigerator in use in the home.

## Philco Establishes Own N.Y. 'Bargain Offer'

(Concluded from Page 1, Column 5) Philco is an ABC unit, and the price of \$39.95 is a reduction of nearly 50% from the previous price of \$79.95.

The York Cool-Wave air conditioner being marketed by Philco at \$150 is claimed to be the lowest priced air-conditioning unit in the field. It is guaranteed to condition rooms up to 150 sq. ft. in area. Larger models are priced at \$275 and \$400.

New with the Philco distributing organization here is a line of kitchen sinks and cabinets made by the Youngstown Pressed Steel division of Mullins Mfg. Corp., Warren, Ohio. A sink with a dishwashing arrangement is offered at \$79.50.

In the radio field, Philco offers a new console at \$59.95, after a \$30 trade-in allowance.

No official prices were announced for the company's television sets, scheduled to appear May 1, but rumors indicated that prices would range from \$150 to \$350, the cheapest quotation for a set with a 3 x 4-inch screen.

A demonstration of the company's portable television transmitter was held in conjunction with the dealer showing. This demonstration was featured by the daily testing of outstanding radio stars and by a luncheon for newspaper advertising managers and reporters. At this luncheon, the principles of television were explained by Albert P. Murray, Philco's chief television engineer.

## Refrigerator Sales In TVA Area Total 4,701 Units

(Concluded from Page 1, Column 3) trical appliance sales of \$2,098,500 for 1938, compared with \$1,820,500 in 1937 and \$1,033,800 in 1936.

Appliances sold by reporting dealers during 1938 included 4,701 refrigerators, 2,449 ranges, 2,654 washers, 414 water heaters, 597 water pumps, 921 electric heaters, and 77 ironers.

Most of the appliance sales did not involve trade-ins, the summary shows. Also interesting is the 1938 pick-up in electric range and washer sales, which together total more than refrigerator sales. Many customers, reports reveal, jumped right from wood stoves to electric ranges, without an "in-between" period of coal or gas stove use.

Average sale per customer on 1938 was \$46.71, a new high record. Residential customers on TVA lines at the end of 1938 numbered 77,200, exclusive of those on government reservations.

## Economy Auto Supply Increases Quarters

ROCKINGHAM, N. C.—Economy Auto Supply, Westinghouse dealer here, has enlarged its quarters, created a separate display room exclusively for electrical appliances, and hired F. B. Stanley as full-time appliance salesman. Claude Mask is manager of the store.

## Pittsburgh Concern Bought By Wesco

(Concluded from Page 1, Column 2) former president, is retained in an advisory capacity.

Westinghouse Electric Supply Co. is a distributing subsidiary of Westinghouse Electric & Mfg. Co., handling distribution of electrical supplies, apparatus, and appliances, with 74 branches.

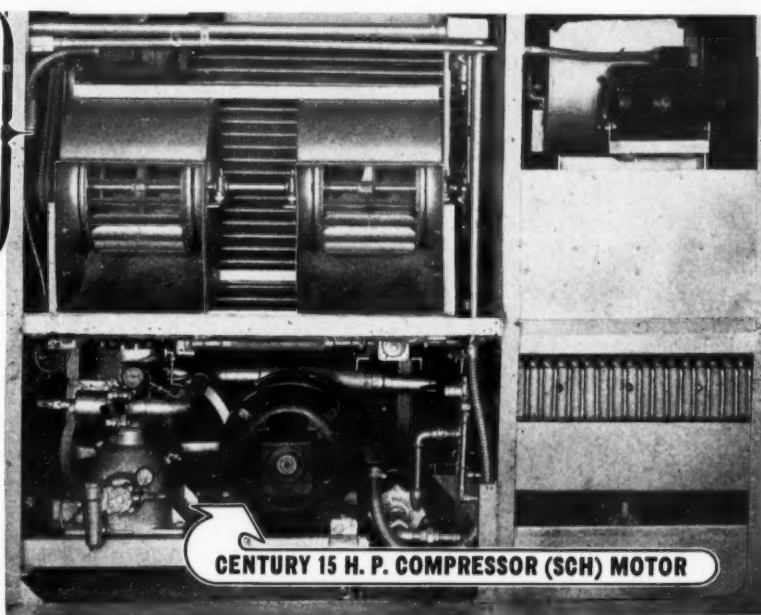
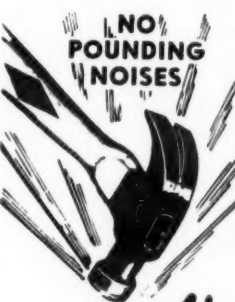
Mr. Bickford has been associated with the wholesale branches of the electrical industry in Pittsburgh since 1903. He has been secretary and treasurer of the Iron City Electric Co. since its incorporation in 1909. For a number of years he was a member of the national executive committee of the National Wholesalers' Association. He served two years as president of the Westinghouse Jobbers Association, and is now president of the Electric League.

## New Porcelain Enamel Has Thinner Coat

CLEVELAND—New ultra-opaque porcelain enamels, expected to reduce application costs and to extend the use of porcelain enamel coatings to many products never before so finished, have been developed by Ferro Enamel Corp. here.

Called "ultra-opaque sheet iron over coats" by Ferro engineers, the new enamels are said to be applicable in a coating 40% thinner than that required by the most opaque of previous porcelain enamels.

**Century**  
1½ H. P. MOTOR  
DRIVING BLOWER  
TO COOL  
CONDENSING  
UNIT



**Century**  
1 H. P. MOTOR  
DRIVING  
AIR CIRCULATOR  
(for Cool Air)



## Air Conditioning MOTOR SPECIALISTS

It takes a lot more power to start and accelerate the modern compressor.

Century, through years of pioneering, research, and engineering, developed motors to meet the new and

exact requirements of modern air conditioning. The Century organization specializes in the complete problems of motorizing the various equipments for every air conditioning need.

### A CENTURY REPRESENTATIVE CAN BE OF HELP TO YOU . . .

A Century representative can be of tremendous help to you—one of these motor specialists can be reached at any one of 31 conveniently located Century branch offices and 125 Century service set-ups—summon the Century representative closest to you—you can have complete confidence in his ability—he will give you full cooperation. Ask him how Century Motors in air conditioning installations save the cost of overmotoring.

### ALL THREE MOTORS IN ONE ENCLOSURE . . . AND THEY OPERATE QUIETLY

Unusually quiet starting and quiet operating under load is another Century Motor accomplishment. Installations like the above are paying a heap of satisfaction to owners and operators. Century makes a complete range of motor sizes from 1/100 to 600 H.P.

### Here is one reason for the exceptionally fine performance of CENTURY MOTORS in Air-Conditioning Installations

The Century Type SCH polyphase motor is particularly suited for operating the modern compressor. This Century Motor has a high starting and accelerating torque necessary for starting and accelerating the modern refrigerator compressor without overmotoring the running load.



**CENTURY ELECTRIC COMPANY**  
1806 Pine Street St. Louis, Mo.  
Offices and Stock Points in Principal Cities

Atlanta • Baltimore • Boston • Buffalo • Chicago • Charlotte • Cincinnati • Cleveland • Dallas • Denver • Davenport • Detroit • Houston • Indianapolis • Kalamazoo • Kansas City • Los Angeles • Milwaukee • Minneapolis • New Orleans • New York • Omaha • Philadelphia • Pittsburgh • Rochester • Salt Lake City • San Francisco • Spokane • Seattle • Tulsa

ONE-OF THE LARGEST EXCLUSIVE MOTOR MANUFACTURERS IN THE WORLD

When You Standardize on PURE . . . DRY . . .

The Preferred METHYL CHLORIDE



You Receive The Benefits of . . . DU PONT RESEARCH & TECHNICAL ASSISTANCE PLUS COAST-TO-COAST DISTRIBUTION



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District Offices: Baltimore, Boston, Charlotte, Chicago, Cleveland, Kansas City, Newark, New York, Philadelphia, Pittsburgh, San Francisco



## Letters on Service Methods

### Majestic Compressor Refuses To Reset

Refrigeration Service Co.  
2210 Tenth St., Sacramento, Calif.  
Editor:

I refer to your Master Service Manual No. 3 by K. M. Newcum regarding Majestic Hermetic sealed refrigeration units.

I have a long standing problem in connection with Model 200 Majestic compressor section. Your Chapter 15 Manual No. 3 gives no information on this important compressor section.

These Model 200 compressors will suddenly cease to pump and only the 200 model refuses to reset. Why?

Was there ever a factory data chart given out on the technical process used in the setting of these pumps, giving vacuum readings under head pressure?

The factory set these pumps and they worked okay. They show no signs of wear yet why do they defy resetting?

If you have such a sheet for sale, I will gladly purchase it from you; I trust the price will not be out of all reason.

This is one piece of information that I have never been able to get.

R. J. TILTON

Answer: We referred your letter to two companies who specialize in servicing Majestic Hermetic compressors, and have received the following information.

The G & G Service Co., 5801 Dickens Ave., Chicago, Ill. writes:

"Answering your letter about trouble in setting the 200 model compressors, please be advised that an electric plug gauge is needed of which we have only the master sets."

The following reply is from the Refrigeration Maintenance Corp., 321 East Grand Ave., Chicago, Ill.:

"In most cases where a Majestic pump refuses to pump the seal has broken on the stator and blocked which allowed the stator to shift. In order to correct this trouble, it is necessary to reset the stator so that the rotor comes within .0004 to .0007 to the stator. After this has been done, it is then necessary to spot weld the stator and block it so that the stator cannot shift.

There is no reason that we know of that the model 200 compressor refuses to set if the parts are not worn and the pump has been reset properly. To our knowledge, there has never been any data published by the factory on the repair of the compressor."

### A Scot Suggests Timer To Cut Long 'Off' Cycle

1034 Maryhill Rd.  
Glasgow, N. W., Scotland

Editor:

Regarding the manuals, I must say that I am very well pleased with them and feel sure the information contained in them, together with the latest developments as published in the NEWS, will give me all the hard-to-get data that I could wish for.

I am radio and refrigeration service manager for a fairly large retail firm here, in the west end of Glasgow, who also do plumbing and electrical work, so we have quite a few departments.

We have not been very long in commercial refrigeration, though we do have one British agency for this. However, we have been installing domestic for a number of years now, and intend to develop our commercial; hence the reason I am seeking as much information as possible.

I am having a bit of trouble just now with two air-cooled butchers' refrigerators which are situated one in an outhouse and the other in a cellar, which occasionally do not cut in on the pressure control, mainly at week-ends due to drop in service load and the long off cycle in the very cold weather we have been having for the last three months.

I would be greatly indebted to you if you could put me in touch with a firm who manufacture a timer suitable for 250-volt pilot switch operation (50 cycle) of a 440-volt 3-phase contactor, probably with a two-minute "on" period at two hourly intervals, as I find that with this circulation the back pressure rises about 7 lbs., more than enough to cut in the compressor, which then works normally, and helps to avoid the danger of slugging.

Many thanks for your kind invitation to do a spot of writing for your news column, but just at the moment I do not think I have anything really interesting to report, but I will certainly keep it in mind as I enjoy reading other subscribers' notes.

ARTHUR S. SUTHERLAND

**BRUNNER**

Send for the New  
REFRIGERATION CATALOG

Seven Models of Compressors  
Fifty-eight Models of High-  
sides from 1/4 H.P. to 15 H.P.  
BRUNNER MANUFACTURING CO.  
UTICA, N. Y.

for  
**BETTER  
SERVICE**

EXTRA DRY  
ESOTO  
V-METH-L  
METHYLENE  
CHLORIDE

**VIRGINIA SMELTING CO.**  
WEST NORFOLK, VA.

### Imperial Brass Co. Now Offers Manifolds To Be Bought 'In Bulk'

CHICAGO—New hard copper tube manifolds for use with standard two-way line valves for refrigeration and air-conditioning work have been announced by Imperial Brass Mfg. Co.

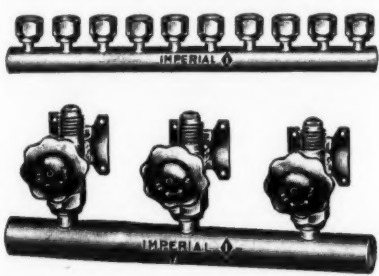
In connection with the new manifolds, the company is promoting the idea of buying manifolds "in bulk," that is, with 12 openings, and then cutting the manifold for the required number of valve openings with a tube cutter.

This practice, it is claimed, not only reduces manifold costs substantially, but also adds convenience since any length manifold is immediately available, and inventory requirements on manifolds are reduced.

For those who prefer manifolds cut to length, however, the manifolds also are available through jobbers with from two to six valve openings as well as with 12 openings.

Manifolds are made from type K copper pipe, and are furnished with flare connections, having a brass

#### New Manifolds



forged flare nut, or with solder connections. In either type, the connections are silver soldered into the pipe on 4-inch centers. In making an assembly, two-way line valves are connected to the manifolds, and the complete assembly is mounted by means of the mounting brackets on the valves.

Large o. d. tubing is used for all manifolds, so that there is no restriction to the flow of gas. Manifolds are furnished without valves, and are designated as No. 188-F when furnished with flare connections, and as No. 188-S when furnished with solder connections.

Manifold adapters which make it possible to make practically any connection to the ends of the manifolds also are offered.

### Tool Designed For Sheet Metal Work

CHICAGO—Quickwork Co. has announced a new combination throatless shear and flanger designed to handle a wide range of sheet metal fabrication.

As a shear, it is claimed, the new "Quickwork" may be used for all straight and irregular cutting, including full circles and curves, both concave and convex, on material of any width or length.

A change of heads converts the tool into a flanger, and attachments and tools can be furnished for "U-ing," wiring, special flanging, and forming, it is said.

The machine is arranged for two cutting and flanging speeds.

It may be used as a bench type or pedestal mounted machine, and for shop work or as portable equipment.

The Most Accurate Control  
Valve for Small  
Capacity Systems

The "TK" Thermo Valve  
Alco Valve Co., St. Louis, Mo.

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DIAPHRAGM PACKLESS VALVES  
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AND FITTINGS - FOR THE  
REFRIGERATION AND AIR  
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Use **CHICAGO SEALS**  
for seal replacements  
A complete line in all sizes  
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20 North Wacker Dr., Chicago

## QUESTIONS

### Chemical Dehumidifiers

No. 3355 (Distributor, North Carolina)—"The writer is interested in air-conditioning equipment other than the regular refrigerated type.

"It is my understanding that there are several new type air-conditioning units now on the market for use in territories that have very high humidity that are of the dehydrator type, using calcium chloride, or like material for this dehydration. I believe such a unit was announced last season by a Philadelphia manufacturer. Can you give me any information on this subject?"

"In 1925 or '26 Copeland announced a commercial setup using Silica Gel as an absorbent and refrigerant. I was handling their household equipment at that time in Florida. I attended the convention at Detroit and their demonstration was very effective. However, on account of some trouble with heating apparatus used in connection with this setup the equipment never became practical and was never marketed by the dealers.

"Any information and names of any manufacturers on any of this type equipment will be appreciated. I have in mind the coasts of the Carolinas, Georgia, and the state of Florida."

Answer: There are a few companies which offer this type of equipment:

Bryant Heater Mfg. Corp.  
17526 St. Clair Ave., Cleveland, Ohio  
Pittsburgh Electrodryer Corp.  
Box 1766, Pittsburgh, Pa.  
Surface Combustion Corp.  
2375 Dor, Toledo, Ohio

Also, the Research Corp. in New York City is manufacturing some such item. Mr. Coey of that company gave a very interesting talk on systems using chemical dehumidifiers before the recent annual convention of the American Society of Refrigerating Engineers.

A report of this talk was published on page 9 of the Dec. 14 issue of AIR CONDITIONING & REFRIGERATION NEWS.

You can probably get in touch with Mr. Stewart Coey through the American Society of Refrigerating Engineers, 37 W. 39th St., New York, N. Y.

### Seeks Issue With Story Of 1929 Patent Suit

No. 3356 (Attorney, Colorado)—"In your issue of Aug. 28, 1929 we note your advertisement relative to the decision in the patent suit of the Frigidaire Corp. vs. General Necessities Corp. tried at Bay City, Mich., March 18 to 23, 1929. Do you have any further copies of the official decision of Judge Arthur J. Tuttle in that case. If not, can you give us the official citation where we can find the case in the Court Reports?"

"We are defending litigation for a refrigeration concern and desire to get all the information we can to better prepare our defense."

Answer: Copies of this supplement containing complete information on this patent suit are available at a cost of \$1.00.

### Statistical Data Now Up-To-Date

No. 3357 (School, Illinois)—"I am greatly interested in obtaining any available statistics you might have on all phases of the refrigeration and air-conditioning fields. I am particularly interested in any figures you may have on specific manufacturers but only slight more so than in the general field."

Answer: See below.

No. 3358 (Reader, Pennsylvania)—"I am interested in obtaining a recent edition of Refrigeration Market Data, a buyer's information guide, I believe published by you."

Answer: You will find all available statistics on refrigeration and air conditioning up to 1935 in the "1935 Refrigeration & Air Conditioning Market Data Book," 304 pages.

We have not published a revised edition of this book, but have compiled a folder containing reprints of

For Information on Motors  
FOR ALL TYPES OF  
Air Conditioning and  
Refrigeration Equipment  
WRITE TO  
**Wagner Electric Corporation**  
4441 LEXINGTON AVE. ST. LOUIS, MO.

### BUNDY TUBING

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**BUNDY TUBING CO., DETROIT**

various tabulations of refrigeration and air-conditioning statistics covering the years 1935, 1936, 1937, and 1938, which have been published in AIR CONDITIONING & REFRIGERATION NEWS.

The Market Data Book, formerly priced at \$3.00 is now available together with the supplementary folder at only \$1.50. The folder alone is priced at 50 cents.

### Present Directory Differs From Former

No. 3359 (Agent, Brooklyn)—"Will you please let me know the data and price of the latest issue of the Refrigeration and Air Conditioning Directory, Volume 1?"

"I would also like to know if Volume 2 includes the names of any individuals—executives, engineers, etc. If so, approximately how many such names does it give? I take it of course that Volume 1 still has approximately the same number of individuals as the 1935 issue did."

Answer: The directories which we are now publishing are somewhat different than the 1935 edition.

We have just published the 1939 Refrigeration & Air Conditioning Directory (D-6) which gives classified lists of manufacturers of refrigeration and air-conditioning products, and includes the following sections: Alphabetic Index of Manufacturers; Air Conditioning Systems and Equipment; Commercial Refrigeration and Equipment; Household Refrigeration and Equipment; Parts, Materials, Supplies & Accessories; Jobbers, Schools, Foreign Manufacturers; Alphabetic Index of Products. Price of this book is \$1.00.

The names of executive personnel of the various manufacturers are being published in pocket-sized directories which give this information by sections of the country. Two of these have been issued so far—Directory D-3 which gives lists of manufacturers and names of executive personnel in the states of Ohio, Michigan, and Indiana; and Directory D-4, which gives the same information for the states of Illinois, Wisconsin, Minnesota, Iowa, Kansas, Nebraska, and Missouri.

Each of these books is now available at a cost of \$1.00 each.

### Makers of Flexible Metal Hose

No. 3360 (Parts & Supply Jobber, Massachusetts)—"We would like to know if you could tell us of a company that manufactures a flexible charging hose for charging ammonia systems."

"We have been using steel pipe for charging but it is quite difficult to use on some jobs."

Answer: The following companies are manufacturers of flexible metal tubing:

American Brass Co.—American Metal Hose Branch, Waterbury, Conn.  
Chicago Metal Hose Corp.  
1315 S. Third Ave., Maywood, Ill.  
Dole Refrigerating Co.  
208 N. Clinton St., Chicago, Ill.  
Kold-Hold Mfg. Co.  
238 Mill St., Lansing, Mich.  
Seamless Co.  
5-19 48th Ave., Long Island City, L. I.  
Summerhill Tubing Co.  
W. Fourth St., Bridgeport, Pa.  
Titeflex Metal Hose Co.  
500 Frelinghuysen Ave., Newark, N. J.

### Blades For Fans On Air-Cooled Unit

No. 3361 (Manufacturer, Nebraska)—"We would appreciate your giving us a representative list of manufacturers of fan blades, such as used on air-cooled condensing units."

Answer: Following are manufacturers of fan blades, such as used on air-cooled condensing units:

Aerovent Fan Co.  
710 E. Ash St., Piqua, Ohio  
Airmaster Corp.  
140 S. Dearborn St., Chicago, Ill.  
Buffalo Forge Co.  
490 Broadway, Buffalo, N. Y.  
Champion Blower & Forge Co.  
Lancaster, Pa.  
Economy Electric Mfg. Co., Chicago, Ill.  
General Regulator Corp.  
2608 Arthington St., Chicago, Ill.  
International Engineering, Inc.  
1145 Bolander Ave., Dayton, Ohio  
Marathon Electric Mfg. Co.  
Plumer's Island, Wausau, Wis.  
National Fan & Blower Co.  
543 W. Washington Blvd., Chicago, Ill.  
Skinner Heating & Ventilating Co.  
1948 N. Ninth St., St. Louis, Mo.  
Steel & Tubes, Inc., Superior Div.  
Elyria, Ohio  
Swift Mfg. Co.  
247 McDougall, Detroit, Mich.  
Torrington Mfg. Co., Torrington, Conn.

A Dehydrator that is really  
Dry. **Mueller Brass Co.**  
**Dri-Drier.**  
**MUELLER BRASS CO.**  
Port Huron, Mich.

**DISPLAY CASES**  
Write for details of this sensational new 100% PORCELAIN Display Case line  
**MIDWEST MFG. COMPANY**  
Galesburg, Illinois

**QuikKold**  
BEVERAGE COOLERS  
10 MODELS  
WRITE FOR CATALOG  
**S&S COOLERS**  
LIMA, OHIO

**UNIVERSAL COOLER**  
Advanced engineering, skilled workmen and precision production methods result in high quality refrigerating units.

**Universal Cooler Corp., Detroit**

**Low cost BEER COOLING**  
**DOLECO** VACUUM COLD PLATES  
Write DOLE REFRIGERATING COMPANY  
5922 N. Pulaski Road Chicago, Illinois

**Anaconda Copper Refrigeration Tubes**  
Unusually long lengths!  
**THE AMERICAN BRASS CO.**  
FRENCH SMALL TUBE BRANCH  
General Offices: Waterbury, Conn.



## Commercial Service

### Analysis of Service Complaints on Fountains Made & Remedies Given

Common types of service complaints in mechanically refrigerated soda fountains and suggested remedies are given in this article, part of the series of articles by Arch Black and Dean C. Seitz on installation and servicing of soda fountains, counter-type ice cream freezers, and frozen foods display cases.

By Arch Black and Dean C. Seitz

The material in this section offers a complete analysis of the service complaints, their causes and remedies, which might occur on any direct expansion fountain controlled by solenoid valves and cold control switches.

The service engineer should not assume that the following comments will apply only to Russ soda fountains. Many of the complaints are common to all soda fountains, and the remedies will therefore apply. The Russ line has been selected for this analysis because it is fitted with solenoid valves and cold controls which make the service operations somewhat different than usual.

#### Complaint—Ice Cream Too Soft or No Refrigeration in Ice Cream Section

##### CAUSE—OUTSIDE ELECTRIC CIRCUIT

1. Solenoid electric circuit disconnected.

If the electric circuit is not connected to the junction box on the outside of the creamer unit, or if an electric switch in this line has been disconnected, current will not flow through the cold control and solenoid valves. Under these conditions, the solenoid valves will remain closed, and consequently no refrigeration will be obtained in either the ice cream or water-cooling circuit. The jar enclosure refrigeration circuit will be the only one obtaining refrigeration. This symptom makes this difficulty very simple to locate and correct.

The obvious correction is to connect the junction box found on the end of the creamer unit with a source of 110 volt a.c. or 115 volt d.c. current. Make certain before connecting that the voltage, cycle, and type of current correspond with the nameplate on the solenoid valve.

2. Fuse blown.

If the condensing unit is not running when the service engineer arrives, the first point to check is the electric circuit of the condensing unit itself. If a fuse is blown or a switch is pulled, the remedy is obvious.

##### CAUSE—COLD CONTROL

3. Cold control adjusted too warm. The indicator dial of the cold control when in the middle of its adjustment will be approximately correct

for the average installation. If the dial is turned counter clockwise to its warmest position (No. 1), the ice cream may be too soft for the customer. He should be carefully instructed on the adjustment obtained by the indicator dial so that minor adjustments of temperature may be made without recording a service call.

At the same time, it would be advisable to explain to the customer that moving the indicator dial will not immediately show results in the ice cream temperature or in its consistency. Some customers may expect miracles from the cold control if its operation is not explained to them.

It is impossible for the cold control to change instantly the temperature of the ice cream in the can. An overnight period of operation is necessary after an adjustment of the ice cream cold control before any effect will be noticed in the ice cream itself.

##### Lost Its Charge

4. Thermal bulb of cold control has lost its charge.

If the capillary line connecting the cold control power element and its thermal bulb has been cracked or roughly handled to permit it to lose its charge, the cold control will hold the switch open continuously, preventing current from passing through the solenoid valve. Under these conditions, the ice cream refrigeration circuit will never receive any refrigeration, since the solenoid valve is always in a closed position.

To make certain that the trouble is with the cold control and not with the solenoid valve, it is necessary to proceed with the testing outlined in the previous article under the sub-heading "How to Test the Solenoid Valve."

After this test has been completed and it has proven that the difficulty is with the cold control, the only remedy is to replace it with a new one. In replacing the cold control, make certain that the new replacement control is for the ice cream refrigeration circuit and not for the water refrigeration circuit. The ice cream refrigeration cold control does not have an off and on switch but the water refrigeration control does have an on and off switch. This is the simplest method of recognizing the difference between the two.

##### Line Too Cold

5. Cold control capillary line too cold.

To obtain a satisfactory operation of the cold control, its bulb must be so located that it will be colder than any point of the capillary line connecting the power element and the bulb. It is possible in installing or servicing a cold control to so bend the capillary line that it touches some point colder than the bulb itself.

This could occur if the capillary line touched the expansion coil as it leaves the ice cream expansion valve just before it enters the ice cream jacket. Under these conditions the capillary line will act as if it were the bulb, permitting the cold control to break the electric circuit long before the desired temperature has been reached in the ice cream refrigeration jacket.

The remedy is to carefully bend the capillary line so that it will not touch or be affected by any of the cold refrigeration lines. In extreme cases it may be necessary to place sponge rubber tubing over the capillary line to protect it from contact with any colder points.

##### CAUSE—THE SOLENOID VALVE

6. The solenoid valve burned out. In order to definitely determine that the solenoid valve is the cause

of the trouble, the test outlined in the last article entitled, "How to Test the Solenoid Valve" should be used.

Any time current passes through the magnetic coil of the solenoid valve, either when the valve is stuck in its open or closed position, or when too great a difference in pressure between the inlet and outlet sides of the valve prevents it from opening, the valve will overheat and probably burn out.

On some of the earlier models of fountains using solenoid valves, these valves were installed in the rear of the bottle storage compartment. Occasionally the humidity in this compartment became so high that condensate would occur inside the cap which houses the magnetic coil. Eventually a short in the magnetic circuit would be the result and the solenoid valve would be burned out.

On any soda fountain where the solenoid valves are located inside the bottle storage compartment, the manufacturer is in a position to supply to those who need it a new set of solenoid valves which may be installed on the outside of the creamer unit. Complete instructions for installing the replacement set of solenoid valves will be received from the manufacturer.

##### Cause Must Be Found

In any case when a service engineer finds a solenoid valve burned out regardless of what may have been the cause, it is absolutely necessary to establish the cause immediately. If the cause is not found and corrected, the trouble will no doubt repeat on each succeeding replacement valve.

The magnetic coil of the solenoid valve may be burned out because of the use of the wrong magnetic coil for the current available. Likewise if water is allowed to continuously drip on the solenoid valve, it may cause a short circuit in the magnetic coil, producing a burn-out.

##### Watch Cut-Out Setting

If the cut-out point of the condensing unit is not set low enough to permit the cold control to break the electric circuit, current will pass continuously through the cold control and solenoid valve circuit, causing it to overheat and eventually burn out the solenoid valve.

It is always necessary to have the cut-out point of the condensing unit sufficiently low (at least 1 lb. under the point at which the cold control, when in its lowest position, breaks the electric circuit), in order to permit the cold control to control the temperature in the ice cream compartment and thereby break the electric circuit passing through the cold control and solenoid.

It is not true that the correct remedy for a burned out solenoid valve is to replace the magnetic coil. It is entirely possible that the cause of the valve burning out was due to either a too great pressure differential between the inlet and outlet of the solenoid valve, or the fact that the solenoid valve was stuck in either the open or closed position. It might also be possible that an appreciable amount of condensate occurred inside the housing of the magnetic coil. As stated above, it is not merely necessary to replace the solenoid valve, but rather, to locate the source of the trouble and correct it on the same service call.

##### Care in Replacing

The true remedy for a burned out solenoid valve is to locate the source of the trouble and then replace the entire valve with a new one, making certain that the new one has the correct current specifications.

In replacing a complete solenoid valve, extreme care must be used in making the soldered connection at the valve. An excess of solder paste may get into the operating mechanism of the valve and cause it to become gummy. In replacing the valve, follow carefully the instructions sent by the manufacturer. All replacement valves should be obtained directly from the soda fountain manufacturer, for in most cases the valves have been specially designed for this application and cannot be obtained directly from the solenoid manufacturer.

##### Pressure Differential

7. Too great a pressure differential between the inlet and the outlet of the solenoid valve.

On the earlier models of Russ fountains shipped during 1935, two small size solenoid valves, model 73-R, were supplied with each fountain. The strength of the magnetic

coil used with these solenoid valves was only sufficient to lift the valves if the pressure differential between the inlet and outlet sides of the valve was less than 50 lbs.

A pressure differential of more than 50 lbs. may occur on the initial installation of the fountain or each time the water bath is defrosted. These conditions were described in greater detail in the previous article under the heading "How to Test the Solenoid Valve."

This condition is most likely to occur on the water bath solenoid valve. The remedy is to replace the entire valve. The soda fountain manufacturer is in a position to supply a larger capacity solenoid valve capable of opening under a much larger differential in pressure between the two sides of the valves.

This larger valve known as model 78, can only be installed on the outside of the fountain. Complete instructions for its installation should be requested from the soda fountain manufacturer at the time the replacement is made. The replacement valve should be obtained only from the soda fountain manufacturer

since they were made especially for this application.

##### Valve Stuck Shut

8. Solenoid valve stuck shut. There are three general causes for a solenoid valve sticking open or shut.

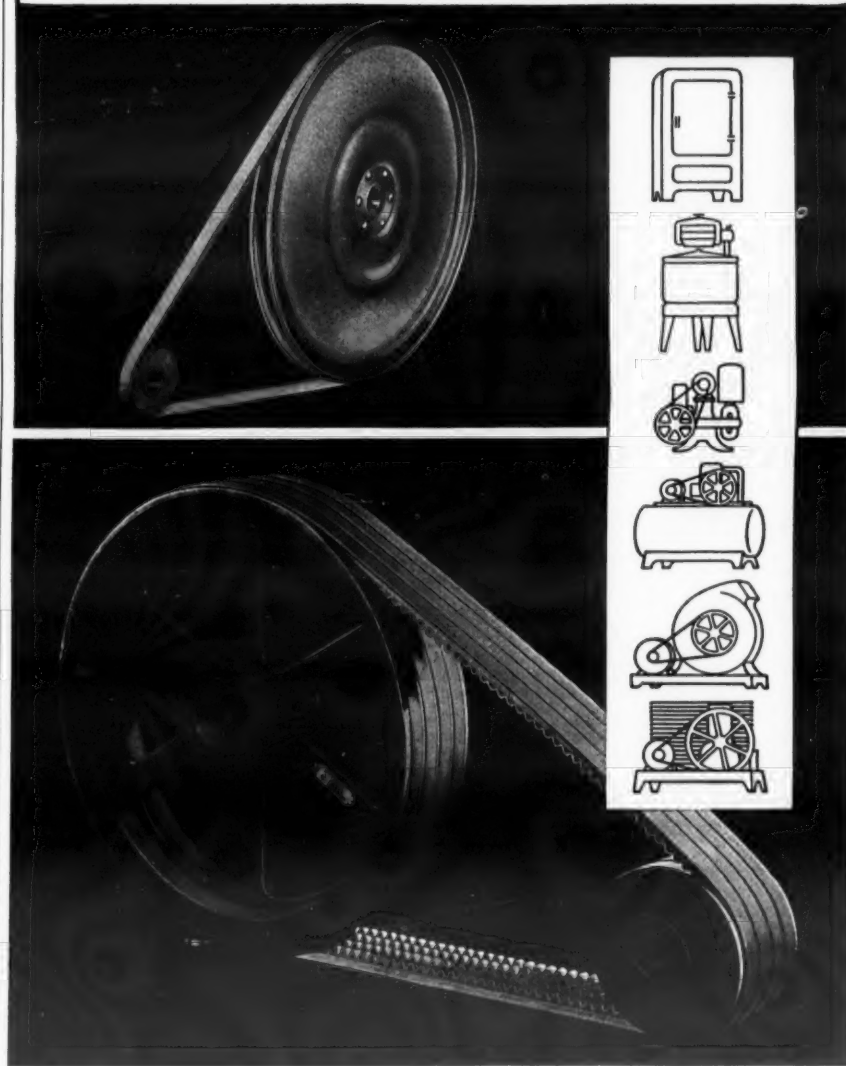
First, if dirt or grit or chips are allowed to enter the refrigeration system, it is possible for them to become lost in the inner guide tube of the solenoid valve.

Second, if an excess of soldering paste is used in making the soldered joint connecting the solenoid valve and suction line, the excess soldering paste will become lodged in the guide tube, causing it to become gummy.

Third, moisture in the system will corrode the steel core of the solenoid valve, causing it to bind in the guide tube and eventually to stick in either the open or closed position.

The remedy is to replace the solenoid valve and use a drier immediately. If a drier has been previously installed on a job, it is time to recharge it, for if the cause of the sticking valve is not eliminated, it will repeat.

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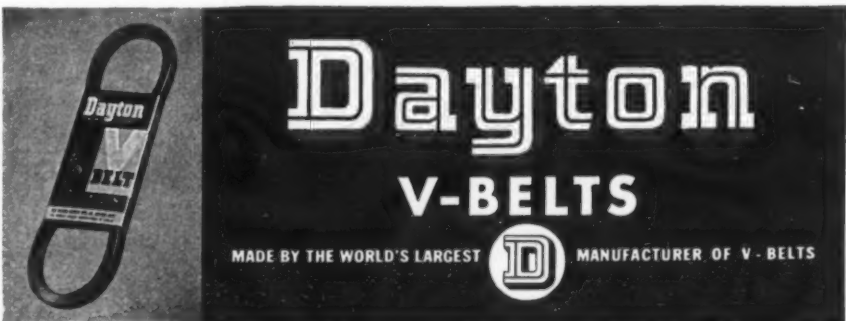
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# Engineering

## McGovern Describes Effects of Moisture In Refrigeration Units & Explains Methods Of Keeping It From Entering the System

**Editor's Note:** Moisture in refrigeration systems has received a considerable amount of attention in industry engineering and research laboratories during the past two years, particularly since men in the field have tended to blame moisture for many of the service problems they have encountered.

Mr. McGovern is one of those who has given the problem intensive study from all standpoints. The results of his study are presented in the following article, first part of which appears in this issue, and the second part—dealing with the various types of chemical dryers—to be published in a later issue.

By E. W. McGovern, R. & H. Chemicals Dept., E. I. du Pont de Nemours & Co.

THE subject of moisture in refrigerating systems and the need for removing it is finally receiving the attention it deserves, since manufacturers of refrigerating equipment and service engineers have learned that a large proportion of service difficulties is due to the presence of water.

The well known acid reaction of moist sulphur dioxide and the quick flare-ups of trouble from wet sul-

phur dioxide systems forced recognition of the need for dry sulphur dioxide systems early in the development of the industry. However, the high resistance to reaction with water to form acids and the neutral nature of methyl chloride, methylene chloride, and the "Freons" led to the early belief that with these refrigerants moisture would not produce any ill effects beyond freeze-ups within the refrigerating system.

Thus ice formation was often "cured" by means of anti-freezes, leaving the water to exert its other bad effects, cause of which were then vainly sought in other directions.

As we are primarily concerned with household, commercial, and air-conditioning refrigerating units, this discussion is limited to the refrigerants commonly used in such systems, namely, sulphur dioxide and the halogenated hydrocarbon refrigerants. The latter include methyl chloride, methylene chloride, ethyl chloride, and the "Freons."

### Effects of Moisture

Corrosion with all of its various complications is the most common effect of moisture in systems containing any of these refrigerants. Oil deterioration is another trouble that may accompany moisture. Freeze-ups and copper "plating" may be encountered in wet halogenated hydrocarbon refrigerant systems.

Among the effects of corrosion are loose bearings, pitted needle valves, leaking seals, and even "frozen" pistons. The products of corrosion include metal salts and oxides which, being solids, can gum up valves and other moving parts and reduce the effectiveness of heat transfer surfaces. The non-condensable gas, hydrogen, formed by the action of acid on metal may in rare instances be troublesome.

That sulphur dioxide and water form sulphurous acid, which is corrosive to all common engineering metals, has been well known. Not so well recognized until more recently was the fact that the halogenated

Table 1—Hydrolysis and Corrosive Effect Of Wet Methyl Chloride (7)

Time of Storage	Temp. °F.	Contents of Tubes	Corrosion Mg./Sq. In.	Acidity as % by Wt. HCl
Start of Tests	77°	Methyl chloride "dry"	...	0.0008%
4 days	122°	Methyl chloride "dry"	...	0.0008%
10 days	122°	Methyl chloride plus 1% water	...	0.0008%
4 days	194°	Methyl chloride plus 2% water	...	0.276%
30 days	122°	Methyl chloride dry and iron strip	...	0.0008%
20 days	122°	Methyl chloride plus H <sub>2</sub> O plus iron strip	6.5	0.043%
20 days	122°	Methyl chloride plus H <sub>2</sub> O plus copper strip	4.4	0.0008%
30 days	122°	Methyl chloride plus H <sub>2</sub> O plus oil plus iron strip	29.1	0.170%
34 days	122°	Methyl chloride plus H <sub>2</sub> O plus oil plus copper strip	9.7	0.365%

hydrocarbons slowly hydrolyze, that is, react with water to form hydrochloric and/or hydrofluoric acid, and that over long periods of time and at high temperatures, which conditions are encountered in refrigerating machinery, they may form sufficient acid to present a serious corrosion problem. None of the common engineering metals will satisfactorily resist large amounts of hydrochloric acid.

### DATA ON BEHAVIOR

Table 1 lists the results of tests showing the development of acid and corrosion of metals by methyl chloride in contact with relatively large amounts of water (0.1% by weight or more).

These data are indicative of the general behavior of all halogenated hydrocarbon refrigerants, although one may differ from another in degree of hydrolysis under a given set of conditions.

Methyl chloride should not be used with aluminum, zinc, magnesium and its alloys and die castings as these may be attacked even when only small amounts of water are present.

Aluminum and methyl chloride, although non-reactive when perfectly dry, may, with only traces of water present, form spontaneously inflammable methyl aluminum compounds. Aluminum alloys containing magnesium should not be used with the "Freons" as corrosion may be encountered in the presence of small amounts of water.

Some oil sludging may be caused by, or is at least enhanced by, the acids formed by moisture. This sludge may act as a binder for solid metal corrosion products and may itself gum up parts of the refrigerating system.

It is known that lubricating oils may dissolve copper from brass or copper parts of refrigerating systems, and while the amount or rate of solution apparently is not affected by moisture and acid, these latter two, along with heat, are factors in throwing the copper out of solution and causing deposits of copper in refrigerating equipment. This condition is commonly called copper "plating."

The solubilities of water and ice in the halogenated hydrocarbon refrigerants are quite low, and therefore a larger amount of water usually gives warning of its presence by a freeze-up. The ice most commonly forms first at the expansion valve, but in very wet systems, tubing and coils carrying cold refrigerant may be blocked.

### SOLUBILITIES OF WATER

Solubilities of water in refrigerants are shown in Table 2. A small amount of water in excess of that which will dissolve at a given temperature may not necessarily interrupt machine operation by a freeze-up as the amount of ice separated may be quite small, and, further, the ice may not necessarily lodge at a place where it will cause blockage.

For example, if we cool "Freon-12" containing 0.008% water to 32° F., 0.002% water may separate as ice. In a system containing 4 lbs. of refrigerant, this would amount to only 0.0013 ounces of ice, equivalent to less than a small drop of water.

Freeze-ups of sulphur dioxide systems are not ordinarily encountered because of the higher solubility of water in sulphur dioxide and the low freezing points of the solutions.

While laboratory tests and theory are serviceable guides in predicting the behavior of moisture in refrigerating systems, we must draw our final conclusions from actual experience and tests with the machinery because of factors encountered in the machine which may not be exactly duplicated in laboratory testing.

For example, in actual practice refrigerant velocities are high and this is very important in affecting corrosion. Also, temperatures at the

discharge valve may be quite high and time of exposure is long. Experience has indicated that the average moisture content of SO<sub>2</sub> and "F-12" systems should be kept below 0.01%.

The limit for "F-12" could be higher but for low ice solubility. The limit for methyl chloride is about 0.015%, and that for methylene chloride about 0.02%, but these should be lowered to the 0.01% limit if high operating temperatures and types of oil introduce a copper "plating" problem.

### Sources of Moisture

It is obvious that we can make a more intelligent approach to the moisture problem if we know the sources of moisture trouble. Possible sources of moisture in refrigerating systems include moisture on original parts and equipment which was not removed from the assembled equipment at the factory, wet oil, wet refrigerant, entrance of moist air during field assembly and servicing, water remaining after pressure testing and washing the equipment, faulty methods of charging oil and refrigerant, leaking water condensers and brine tanks and water cooled cylinder heads, leaking seals, moist air drawn into system, and perhaps slow oxidation of oil by air to form water.

Machine manufacturers are quite alive to the moisture problem, and equipment as received from the factory may generally be assumed to be quite dry. The same is true with many supplies and accessories, but care is required with some of these to insure dryness.

Lubricating oil for refrigerating systems is not sold on a maximum percentage by weight moisture specification, but this point is covered by a dielectric strength specification which commonly does not exceed 30,000 volts minimum. Oil contain-

Table 2—Solubility of Water In Refrigerants

Temp.	Methyl Chloride (7)	Methylene Chloride (7)	'F-12' (8)
-10.7° F.	.026	.....	.....
-5.4° F.	.....	.0321	.....
26.6° F.	.....	.0796	.....
32.0° F.	.....	.....	.006
33.8° F.	.257	.....	.....
42.8° F.	.....	.115	.....
60.0° F.	.....	.....	.0114

ing as much as about 0.01% by weight water may pass this specification. A 25,000 volt oil may contain as much as .03% water.

It is thus apparent that an appreciable amount of water may be introduced by oil fresh from the refinery. However, experience has shown that the amount of moisture in the better oils is of no consequence if it is not greatly added to by moisture from other sources. To keep oils dry, they should be kept in tightly closed containers and receive minimum exposure to the atmosphere.

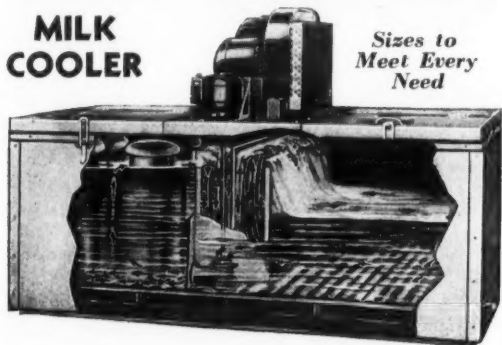
A breather tube containing a drying agent such as Drierite, Activated Alumina, Silica Gel, or calcium oxide may be used to dry air drawn into the container as oil is withdrawn.

Refrigerant manufacturers in general sell methyl chloride on a specification of 0.008% by weight maximum water; the specification for sulphur dioxide is generally 0.005% maximum, that for "Freon-12" 0.0025% maximum. These specifications and careful chemical control by the manufacturers insure products of satisfactorily low water content.

However, a refrigerant may be contaminated when it is transferred to small service cylinders which have not been properly dried. Therefore, containers used in repackaging

(Concluded on Page 15, Column 1)

## Wilson ZERO-FLOW MILK COOLER



"Inquiries produced by our advertising in Air Conditioning & Refrigeration News have been very satisfactory in the home market. Results from abroad surprising."

-- W. F. Fleming, Wilson Cabinet Corp.

### Inquiries

Wilson Cabinet Corp.:

We have seen in Air Conditioning & Refrigeration News an advertisement about cold whirl milk coolers.

We are distributors for Belgium of refrigerating equipment manufactured by the General Electric Co. and we believe there might be an outlet also for your fixtures in our territory.

We should appreciate it therefore if we could receive your catalog and prices and best export discounts.

S E M

Capetown, South Africa

Messrs. Wilson Cabinet Corp.:

I shall be glad if you will kindly let me have your Catalogues and Price list for "Wilson Electric Coolers" as advertised in "Air Conditioning & Refrigeration News."

J. DAVIDOFF

THE NEWS is carefully read not only by important buyers in all parts of the United States but it establishes contact with buyers all over the world.

Air Conditioning & Refrigeration News  
"The Newspaper of the Industry"

Tientsin

Messrs. Wilson Cabinet Corp.:

We read your advertising in the AIR CONDITIONING & REFRIGERATION NEWS and provided you are not yet represented in the North China territory, it will afford us a pleasure to act as your agents.

With this end in view it is desired that you supply with full particulars net agents costs for the different lines manufactured.

For reference you may apply to the local branch of The National City Bank of New York.

The "Ein-Tai" Co.

Sherbrooke, Que.

Wilson Cabinet Corp.:

Having seen your advertisement in the newspaper "Air Conditioning & Refrigeration News," we would like to have descriptive folders of ZERO-FLOW Milk Coolers.

Hoping to hear from you in the near future.

DUQUETTE SPECIALTIES



## Drying of Refrigeration Systems By Heat & Vacuum Methods Described

(Concluded from Page 14, Column 5)  
should be subjected to at least as much care to ensure dryness as is accorded the refrigerating machine—by flushing out with warm dry air, heating under vacuum, flushing with dry refrigerant, or combinations of these treatments.

### EXTRA PRECAUTIONS

Extra precautions are required to prevent moisture trouble in commercial units such as walk-in coolers and display cases which have their assembly completed in the field, even though the low side and high side parts may both be dry when shipped from the factory. The same applies to equipment opened up for repair or service operations.

We can ascribe the need for extra precaution in part to moisture picked up from the surrounding air by the open equipment. Since 86° F. air of 100% relative humidity contains only about .03 ounce water per cubic foot, which is even less than that contained in a cubic foot of reasonably dry liquid refrigerant, it would appear that adsorption of water from air on the metal surfaces and condensation of water from the air on cooler metal surfaces are the important factors rather than the simple trapping of a small amount of moist air.

In manufacturing or servicing, equipment may be subjected to hydrostatic testing; or cleaned and degreased with aqueous solutions of an alkali or other detergent; or flushed with water to remove water soluble contaminants such as brine which may have leaked into the system, calcium chloride drying agent, or corrosion products. In this way relatively large quantities of water may remain in pockets if only a cursory drying method is employed.

### EASILY CONTAMINATED

While satisfactorily dry oil and refrigerant may be on hand, they may easily be contaminated with moisture equivalent to a few drops if great care is not taken in transferring them from container to refrigerating equipment.

In these operations, water may come from the refrigerant charging connections and fittings, a dirty funnel, or prolonged exposure of oil to moist air.

A substance like oil, which ordinarily will not absorb moisture from air, may do so when it is highly dehydrated and especially if it is poured in a long, slow, thin stream through humid air so that it gets maximum contact.

In factory and wholesale servicing, it often pays to avoid contact of oil with air altogether by means of a charging board similar in principle to the type commonly used for refrigerants.

Large quantities of water may enter a system from a leaking condenser or water cooled head, or from brine or spray water being cooled by refrigeration. Sometimes one of these sources is overlooked when servicing a machine, and a difficult

overhauling, drying, and recharging job must soon be followed by another.

When operating under a vacuum, air may be drawn into a low side through a leaking seal, or less commonly, through a leak in another part of the low side. This can more readily occur with low pressure refrigerants such as sulphur dioxide and methylene chloride, but obviously it can occur with others if evaporator temperatures are low enough. It would seem that the amount of moisture introduced by air would generally be of little or no consequence.

However, small as the quantity is, it adds to whatever water that may already be in the system. Furthermore, if a leak is not repaired and the system is continually purged with no provision made for moisture removal, considerable moisture may be introduced.

Another possible effect of air in refrigerating systems is that it may slowly oxidize oil, combining with the hydrogen in the latter to form water. A cubic foot of air at atmospheric pressure contains enough oxygen to form approximately 0.3 ounce of water.

It is known that air will cause oils to oxidize and sludge, and although it is said that oxidation below 450° F. does not form considerable amounts of water, it does not seem unreasonable to suppose that enough may be formed from air and oil under conditions of machine operation to be a factor.

### Drying Methods

Methods of preventing moisture trouble, which consist of, first, doing everything possible to keep moisture out of the system and, second, removing the water if it does chance to be present, often go hand in hand.

Means of keeping moisture out of systems are necessarily numerous and diverse, because of the many ways that moisture may enter a system; each source or condition must be considered separately. Likewise, methods of moisture removal that may be used justifiably are numerous because of differences in available facilities and equipment and differences in the moisture problems presented, let alone differences in opinion as to how to attack a given problem.

Methods of moisture control that are used by builders of equipment include baking in vacuo; vacuum treatment at room temperatures, generally for large machines and sometimes combined with dry air flushing; flushing with dry air or dry refrigerant; the use of temporary and permanent chemical dryers; and strict moisture "hygiene." By the latter is meant extreme vigilance to prevent entrance of moisture into equipment from all possible sources.

Flushing with liquid refrigerant, especially in the case of sulphur dioxide machines, is sometimes used; a machine may be "run in" with refrigerant which is then discharged and replaced.

### Baking In Vacuo

It is almost universal factory practice to dry small machines by evacuating them while they are heated in a hot room or oven. Vacuum and temperature are both high so that evaporation of water is sufficiently rapid and so that the remaining air and water vapor are highly attenuated and therefore negligible in quantity. The length of treatment must be sufficient to allow the equipment to be brought up to temperature, to allow pumping a high vacuum, to allow all liquid water to evaporate, and to insure removal of water held adsorbed on metal surfaces.

Sulphur dioxide systems are commonly baked at 250°—275° F. for at least four hours under a vacuum greater than 29.5 inches (less than 1/2 inch mercury or 0.25 pounds absolute pressure).

The hot, highly attenuated water vapor left in the system by such a treatment would at most amount to only about 0.0095 ounces of water per cubic foot of internal machine volume or about one-half drop of water in a machine of 0.1 cubic foot internal volume.

In some very critical operations, or when vacuum or temperature are

not sufficiently high, the first baking under vacuum may be followed by filling the machine with dry air or dry refrigerant and then repeating the hot vacuum treatment. This serves to flush out most of the small amount of residual moisture left after the first treatment. In thermostat manufacture where bulbs are filled with a gas such as methyl chloride, the vacuum-methyl chloride vapor flush cycle may be repeated three times to insure removal of air and moisture.

### Vacuum Treatment At Room Temperature

Vacuum baking of large machines in the factory or after assembling in the field or in servicing in the field is often not practicable. For such machines, high vacuum treatment at room temperature is commonly used.

A common mistake is the failure to apply a high enough vacuum to cause the water to boil. For example, if only a moderately high vacuum is applied, say 28 inches, water in the system will not boil unless it is raised to a temperature of at least 104° F., which is above room temperatures ordinarily encountered. At 59° F., a vacuum of about 29.5 inches is required to produce boiling.

Another error sometimes encountered is the failure to apply the vacuum long enough to allow removal of adsorbed water and complete evaporation of all free liquid water. Heat must be supplied to boil water, and depending upon the rate at which heat is supplied by the metal parts of the refrigerating

machine which pick it up from the surroundings, with sufficient vacuum pump capacity, the liquid water present cools down to a temperature where the rate of boiling is slow enough to be in line with the rate of heat supply.

This vacuum drying may be speeded by gentle application of heat at points where pockets of liquid water may be collected. Also, these very wet systems may be flushed with anhydrous methanol (methyl alcohol) before vacuum is applied.

The residual methanol is more easily removed by vacuum treatment than is residual water since it is lower boiling, has a lower latent heat of evaporation, and has a lower specific heat. If the inside of a system is coated with oil or oil sludge, it is well to remove these by flushing with carbon tetrachloride or trichloroethylene before the methanol flush. Otherwise, oil and sludge which are insoluble in methanol may mask water from the solvent action of methanol.

Another refinement of vacuum treatment at room temperature is to fill with dry air or refrigerant vapor after evacuating and then reevacuate, as is sometimes done in vacuum baking.

When vacuum is not available, moisture may be removed by flushing with dry air or refrigerant vapor. Air which is pumped into the refrigerating compressor may be conveniently dried with Drierite, Activated Alumina, or Silica Gel. These may be reactivated after such use.

Instead of pumping dry air through the machine it may be drawn through by means of a vacuum

pump; a high vacuum pump is not required in this case and the water jet type may be used. Moisture evaporates rapidly into the dry air or refrigerant, especially since continual removal of water vapor by the moving gas stream prevents saturation of the latter.

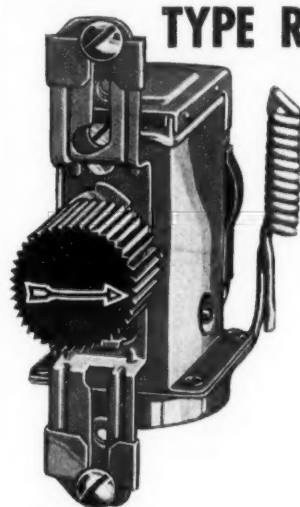
Heat applied to the air or to the equipment speeds the process. As with vacuum treatment, a preliminary flushing with methanol speeds the drying when the system is quite wet.

After drying in the field by vacuum or flushing with dry gas, there may still be some doubt as to whether or not all water is removed. When the vacuum method is used on a tight system, it can be assumed that no large amount of water remains if a very low vacuum can be held when the pump is shut off.

Testing the dry gas flushing method for the "end point" is more difficult, although the gas stream might be slowed down and tested for moisture as it leaves the equipment by a test paper impregnated with cobalt chloride which is blue in a humid atmosphere, red in a dry; or the effluent gas might be moisture tested with a humidity measuring device. However, the degree of water removal by vacuum or flushing treatments is often doubtful, and there is the possibility that moisture may again be introduced when refrigerant or oil is charged or after the machine is in operation. For this reason, installation of a temporary or permanent chemical dryer may often be advisable in the field, and sometimes in the factory, particularly with larger units.

(To Be Concluded In a Later Issue)

## THE BUYER'S GUIDE



### TYPE RJS—RANCO'S New General Replacement for All Single Dial Control Applications

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Columbus, Ohio, USA

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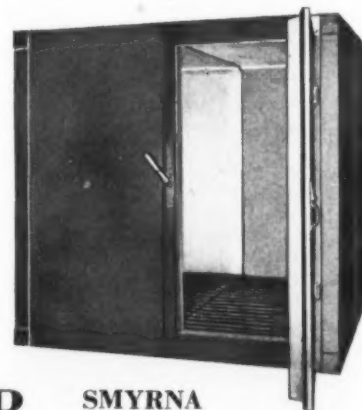
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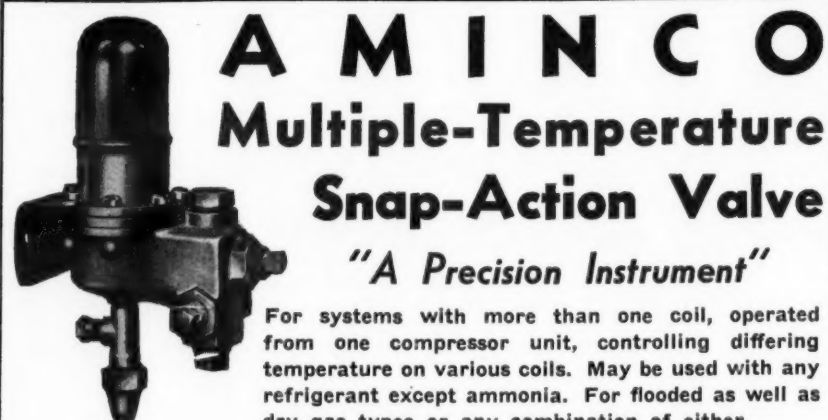
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## AMINCO Multiple-Temperature Snap-Action Valve

"A Precision Instrument"

For systems with more than one coil, operated from one compressor unit, controlling differing temperature on various coils. May be used with any refrigerant except ammonia. For flooded as well as dry gas types or any combination of either.

Any variety of units such as ice cream cabinets, soda fountains, back bars, water coolers, candy counters, beer coils, storage rooms, etc. may be connected up to a single compressor unit by the use of AMINCO Multiple Temperature Valves. Adjustable from 20" of vacuum to 63 lbs. pressure. Differential 7 lbs. min. to 29 lbs. max.

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Write For Complete Information About These Extra Profit Builders.

**ALL-STEEL-EQUIP COMPANY  
INCORPORATED**  
1315 Kensington Avenue Aurora, Illinois

## 'Afternoon Fatigue' of Insurance Workers Ended By Cooling

UTICA, N. Y.—Almost complete elimination of "afternoon fatigue" usually experienced by employees has justified the installation of a year-around air-conditioning system in the office building of Commercial Travelers Mutual Accident Association of America here, declares Edward Trevvett, assistant secretary-treasurer.

The system has satisfactorily met not only the cooling load of summer, but also has given adequate warmed and conditioned air in winter, Mr. Trevvett points out.

Hudson Air Conditioning Corp., General Electric distributor in Washington, D. C., installed the system, and G. B. Hightower, of the G-E air-conditioning department at Bloomfield, N. J., helped to direct the installation.

### DIVIDED INTO ZONES

Building was divided into five separate zones for year-around conditioning, and one zone for just winter conditioning with direct radiation.

To conserve floor space and simplify the installation, the system was centrally installed in the basement of the building. Seven oil furnaces to furnish steam were placed in one of the old boiler rooms, and a 5,000-gallon oil tank was installed in an old coal bunker, and covered with a new concrete slab, poured to fit.

A 40-hp. compressor and a two-speed 50-hp. compressor were placed in an old storage space, as were the 7½-hp. cooling tower pump and condenser water pump. The room was selected so that refrigerant lines could be kept as short as possible.

Also to save floor space, all air conditioners for the various zones were located in the basement near the compressors. Cooling tower was placed on the roof atop the elevator penthouse to insure good circulation.

### ZONE 1 LARGEST

Zone 1, the largest and having the greatest exposure, consists of the entire one and two-story extension at the rear of the building, exposed on three sides and with roof above. All conditioning for this zone was supplied from a single unit containing direct expansion cooling coils, extended surface copper heating coils, drip pan humidifiers, and viscous glass wool filters.

The fan was mounted externally and driven by a 5-hp. motor through v-belt drives. Total airflow to this zone is 14,000 c.f.m. Refrigerating effect is produced by a 40-hp. reciprocating compressor with shell-and-tube "Freon" condenser.

Steam for the heating coils is supplied through a modulating valve on the main steam supply line from the boiler room. The zone contains the accounting department, two mailing rooms, underwriting department, file and photostatic rooms.

### DIFFICULT PROBLEM

Zone 2, the first floor of both old and new buildings at the front, consists of reception room, private offices, and vault. The latter presented an exceptionally difficult problem because no openings were permitted into the vault through which ducts could be run.

The vault consists of two floors, the first one in the basement. In order to circulate conditioned air through it, air was discharged in a closed hallway into which the basement vault door opens. A brick duct was constructed at the rear corner of the vault, with two openings in the basement room, and an opening at the ceiling of the second floor room to accommodate a 12-inch fan.

### SOLUTION

With this arrangement, and the vault doors left open during working hours, it is possible to circulate conditioned air through the basement vault, up to the duct into the room above, and out into Zone 2 space. Because of the small load involved, a small conditioner was used, with fans mounted on the inside and driven by a 1-hp. motor. For economy, this zone is connected to city water supply instead of to the main cooling tower.

Zones 3 and 4 consist of the front and rear portions, respectively. (Concluded on Page 17, Column 3)

## Number of Installations By Types of Businesses Shown In Surveys

*Editor's Note:* Continuing in this issue is the publication of surveys of air-conditioning installations made in leading cities and population centers of the United States. Cooperation of local power companies has enabled the NEWS to compile these figures.

The surveys break down the installations by types of businesses, showing the number and horsepower for each type for years prior to 1937, during 1937, during 1938, and the totals.

Also published are complete installation records for 1938 of Sioux City, Iowa, and Akron, Ohio, found on the following page.

### Indianapolis, Ind.

(Data Supplied by the Indianapolis Power & Light Co.)

Classification	Prior to 1937		During 1937		During 1938		Total	
	No.	Hp.	No.	Hp.	No.	Hp.	No.	Hp.
Banks	1	45.25	0	0.0	1	40.5	2	85.75
Beauty & Barber Shops	3	28.25	2	3.6	1	8.5	6	38.35
Churches	2	35.5	0	0.0	0	0.0	2	35.5
Club	1	11.5	0	0.0	0	0.0	1	11.5
Doctors' & Dentists' Offices	2	1.5	5	2.83	1	0.5	8	4.83
Drug Store	0	0.0	0	0.0	1	15.5	1	15.5
Hospitals	2	21.5	4	69.5	1	8.5	7	99.5
Hotels	0	0.0	1	0.5	1	14.0	2	14.5
Industrial								
Baking	0	0.0	1	8.0	0	0.0	1	8.0
Candy Mfg.	1	10.0	0	0.0	0	0.0	1	10.0
Dairy & Ice Cream	2	27.0	1	10.0	0	0.0	3	37.0
Miscellaneous	4	660.0	0	0.0	2	21.5	6	681.5
Laboratories	2	79.0	0	0.0	1	45.0	3	124.0
Library	1	15.25	0	0.0	0	0.0	1	15.25
General Offices	13	329.83	16	221.58	11	77.15	40	628.56
Private Offices	24	27.33	15	15.6	11	11.78	50	54.71
Residences	49	104.75	22	36.06	13	19.05	84	159.86
Restaurants	26	431.25	7	122.5	5	110.5	38	664.25
Stores (Dept. & Clothing)	13	2,076.5	3	388.0	4	263.7	20	2,728.2
Stores, Miscellaneous	8	64.0	8	65.91	6	26.19	22	156.1
Broadcasting Studios	3	10.25	1	9.0	0	0.0	4	19.25
Theaters	8	981.0	14	305.75	3	45.5	25	1,332.25
Undertakers	2	11.75	7	49.0	3	4.75	12	65.5
<b>Total</b>	<b>167</b>	<b>4,969.41</b>	<b>107</b>	<b>1,307.83</b>	<b>65</b>	<b>712.62</b>	<b>339</b>	<b>6,989.86</b>

### Beaumont, Texas

(Data Supplied by the Gulf States Utilities Co.)

Classification	Prior to 1937		During 1937		During 1938		Total	
	No.	Hp.	No.	Hp.	No.	Hp.	No.	Hp.
Residences	5	60.0	1	2.66	9	20.0	15	82.66
Restaurants	6	104.0	0	0.0	7	108.8	13	212.8
Offices	1	7.0	1	4.0	5	32.9	7	43.9
Theaters	4	380.0	0	0.0	1	72.0	5	452.0
Dry Cleaner	1	6.0	0	0.0	0	0.0	1	6.0
Retail Stores	3	29.0	7	112.9	8	49.3	18	191.2
Air-Conditioning Dealer	1	10.0	0	0.0	0	0.0	1	10.0
Department Store	1	20.0	0	0.0	0	0.0	1	20.0
Federal Court Room	1	10.0	0	0.0	0	0.0	1	10.0
Offices & Sales Rooms	2	82.0	1	13.5	0	0.0	3	95.5
Barber Shop	1	4.0	0	0.0	0	0.0	1	4.0
Banks	1	60.0	1	18.5	0	0.0	2	78.5
County Court House	1	100.0	0	0.0	0	0.0	1	100.0
City Auditorium	1	200.0	0	0.0	0	0.0	1	200.0
Drug Stores	0	0.0	3	75.3	1	5.75	4	81.05
Hotels	0	0.0	2	111.33	1	375.0	3	486.33
Night Club	0	0.0	1	25.0	0	0.0	1	25.0
Industrial	0	0.0	0	0.0	1	6.0	1	6.0
<b>Total</b>	<b>29</b>	<b>1,072.0</b>	<b>17</b>	<b>363.2</b>	<b>33</b>	<b>669.75</b>	<b>79</b>	<b>2,104.95</b>

### El Paso, Texas

(Data Supplied by the El Paso Electric Co.)

Classification	Prior to 1937		During 1937		During 1938		Total	
	No.	Hp.	No.	Hp.	No.	Hp.	No.	Hp.
Theaters	6	322.5	1	75.0	0	0	7	397.5
Shoe Stores	1	7.5	1	9.0	0	0	2	16.5
Grocery Stores	3	13	0	0	0	0	3	13.0
Drug Stores	3	44	0	0	0	0	3	44.0
Office Bldgs.	1	20	0	0	0	0	1	20.0
Residences	6	10	0	0	2	6.0	8	16.0
Hospitals	1	20	0	0	0	0	1	20.0
Offices	5	33.5	0	0	1	10.0	6	43.5
Department Stores	2	30	0	0	1	160.0	3	190.0
Cocktail Bars	1	12	0	0	0	0	0	12.0
Cleaning Establishments	1	4	0	0	0	0	1	4.0
Telephone Co.	2	50	0	0	0	0	2	50.0
Hotels	2	92	0	0	2	114.0	4	206.0
Funeral Homes	2	20.5	0	0	0	0	2	20.5
Bowling Alleys	1	30	0	0	0	0	1	30.0
Night Clubs	1	15	1	10	0	0	2	25.0
Retail Stores	0	0	1	67	0	0	1	67.0
Utility Office	0	0	1	17.5	0	0	1	17.5
U. S. Govt. Office	0	0	0	0	1	11	1	11.0
<b>Total</b>	<b>38</b>	<b>724</b>	<b>5</b>	<b>178.5</b>	<b>7</b>	<b>301</b>	<b>50</b>	<b>1,303.5</b>

### Sioux City, Iowa

(Data Furnished by the Sioux City Gas & Electric Co.)

Classification	Prior to 1937		During 1937		During 1938		Total	
	No.	Hp.	No.	Hp.	No.	Hp.	No.	Hp.
Offices	18	94.5	4	12.5	8	21.9	30	128.9
Restaurants	6	67.0	3	38.0	2	13.5	11	118.5
Theaters	2	425.0	0	0.0	0	0.0	2	425.0
Stores	18	208.0	0	0.0	1	30.0	19	238.0
Residences	11	16.75	9	17.5	4	4.5	24	38.75
Barber Shops	3	7.5	1	4.0	0	0.0	4	11.5
Banks	0	0.0	1	11.5	1	15.0	2	26.5
Bar	0	0.0	0	0.0	1	3.5	1	3.5
Hotels	0	0.0	3	40.0	1	46.0	4	86.0
Miscellaneous	3	24.5	0	0.0	0	0.0	3	24.5
Printing Office	0	0.0	1	8.75	0	0.0	1	8.75
Funeral Homes	0	0.0	2	9.0	0	0.0	2	9.0
Department Stores	0	0.0	3	619.0	0	0.0	3	619.0
Apartment	0	0.0	2	2.0	0	0.0	2	2.0
Beauty Parlor	0	0.0	1	1.5	0	0.0	1	1.5
<b>Total</b>	<b>61</b>	<b>943.25</b>	<b>30</b>	<b>763.75</b>	<b>18</b>	<b>132.4</b>	<b>109</b>	<b>1,739.4</b>



# Air Conditioning

## Richmond, Va.

(Data Supplied by the Virginia Electric & Power Co.)

Classification	Prior to 1937		During 1937		10 Mos., 1938		Total	
	No.	Hp.	No.	Hp.	No.	Hp.	No.	Hp.
Restaurants	6	97.0	3	28.0	4	86.0	13	211.0
Theaters	8	1,030.0	3	150.0	2	100.0	13	1,280.0
Stores	35	2,281.0	7	68.0	7	243.0	49	2,592.0
Offices	22	114.0	12	70.0	17	169.0	51	353.0
Beauty Parlors	3	22.0	3	20.0	5	20.0	11	62.0
Funeral Homes	3	56.0	0	0.0	2	21.0	5	77.0
Hotel	0	0.0	0	0.0	1	125.0	1	125.0
Factories	6	650.0	0	0.0	1	260.0	7	910.0
Banks	1	60.0	1	9.0	0	0.0	2	69.0
Residences	27	53.0	5	7.0	6	7.0	38	67.0
Hospitals	2	16.0	1	7.0	0	0.0	3	23.0
Miscellaneous	1	17.0	2	29.0	7	68.0	10	114.0
<b>Total</b>	<b>114</b>	<b>4,404.0</b>	<b>37</b>	<b>388.0</b>	<b>52</b>	<b>1,099.0</b>	<b>203</b>	<b>5,891.0</b>

## Kansas Electric Power Co. Territory

(Data Furnished by the Kansas Electric Power Co.)

Classification	Prior to 1937		During 1937		During 1938		Total	
	No.	Hp.	No.	Hp.	No.	Hp.	No.	Hp.
Theaters	3	120.0	1	62.5	1	97.0	5	279.5
Hospitals	2	1.5	0	0.0	0	0.0	2	1.5
Offices	4	23.25	7	42.0	5	3.75	16	69.0
Restaurants	4	32.5	5	17.75	5	30.25	14	80.5
Stores	1	7.5	7	74.75	0	0.0	8	82.25
Beauty Parlors	2	10.0	1	9.5	0	0.0	3	19.5
Funeral Homes	2	15.0	2	12.0	0	0.0	4	27.0
Physicians' Offices	2	3.75	3	1.5	0	0.0	5	5.25
Institutions	2	101.5	1	1.5	0	0.0	3	103.0
Residences	8	17.0	4	6.25	4	2.75	16	26.0
Drug Stores	0	0.0	0	0.0	2	9.0	2	9.0
<b>Total</b>	<b>30</b>	<b>332.0</b>	<b>31</b>	<b>227.75</b>	<b>17</b>	<b>142.75</b>	<b>78</b>	<b>702.5</b>

## Where Air-Conditioning Systems Were Installed In Sioux City In 1938

(Data Compiled by the Sioux City Gas & Electric Co.)

Name and Address	Make of Equipment	Hp.
<b>Bank</b>		
Toy National, Fourth & Nebraska Sts....	Westinghouse	15.0
<b>Bar</b>		
Manderscheid's Brass Rail, 601 Pearl.....	Frigidaire	3.5
<b>Homes</b>		
L. Davidson, Bellevue Apts.....	Carrier	.75
L. Kaplan, 3620 Stone Park.....	Frigidaire	2.0
Sam Pickus, 3319 Pierce.....	Carrier	.75
Ed. Palmer, 2902 Jackson.....	Frigidaire	1.0
<b>Offices</b>		
Associated Retailers, Commerce Bldg.....	Carrier	10.0
E. E. Baron, 323 Frances Bldg.....	Carrier	.5
Physician's Optical Co., 232 Davidson Bldg.....	Frigidaire	2.0
Brodkey & Goodsite, 400 Fourth St.....	Frigidaire	3.2
Dr. L. J. Dimsdale, 433 Frances Bldg.....	Frigidaire	1.0
Holdcroft Transportation Co., 1300 Fourth.....	Frigidaire	3.2
Dr. W. L. Fickey, 519 Frances Bldg.....	Frigidaire	1.0
Dr. F. N. Wagner, 501 Frances Bldg.....	Frigidaire	1.0
<b>Restaurants</b>		
Dixie Shop, Fifth & Pierce Sts.....	Westinghouse	10.0
Baxter's Lunch, Greenville	Frigidaire	3.33
<b>Hotel</b>		
Martin Hotel, Fourth & Pierce Sts.....	Frigidaire	46.0
<b>Store</b>		
J. C. Penney Co., Inc., 412 Fourth St.....	Westinghouse	30.0

## Installations In Akron During 1938

(Data Compiled by Ohio Edison Co., Akron Division)

Name and Address	Make of Equipment	Hp.
<b>Store</b>		
Eckerd's Drug, 208 S. Main St.....	Westinghouse	8.5
<b>Residence</b>		
J. C. Cress, 598 Melrose.....		1.5
<b>Restaurants</b>		
Garden Grill, 184 S. Main St.....	Frigidaire	36.0
Chestnut Bar, 803 N. Main St.....	Carrier	5.0
Mauer's Restaurant, 9 E. Market St.....	Carrier	5.0
<b>Theaters</b>		
Elanese Theater, 25 S. Main St.....		47.5
Park Theater, 588 W. Tusc. Ave., Barberton	Westinghouse	15.5
<b>Miscellaneous</b>		
Davis Candy Co., 1046 N. Main St.....	Carrier	2.0

## Insurance Co. Building Is Divided Into 5 Zones For Air Conditioning

(Concluded from Page 16, Column 3)

ively, of the second, third, and fourth floors, and they have almost identical control and equipment. These areas were so grouped because they have identical losses and exposures.

Conditioned air is supplied to each floor in these zones through a central trunk duct passing up through the center of the building. Conditioners are similar to those used elsewhere in the building, but refrigeration is supplied by a two-speed 50-hp. condensing unit serving Zones 3, 4, and 5. Refrigerant flow to the conditioner coil is controlled by a solenoid valve in the liquid refrigerant line.

This hook-up is so arranged that any of the three zones requiring cooling will start the compressor and simultaneously open the solenoid to that zone conditioner. Speed of the compressor depends on the load and is actuated by back-pressure control. Cooling tower and condenser water pump will start and stop with either compressor to give economical operation.

Entire fifth floor of the building constitutes Zone 5, and has exposure on all four sides with skylights in the roof above. The zone contains four private offices and a large filing space. Conditioning equipment is the same as in Zones 3 and 4, except that booster heating coils are installed in the two branch ducts leading to the east and west sides of the building, allowing separate temperature control during the winter for an area which might otherwise be out of balance because of wind conditions.

Throughout the building, air is discharged through grilles at relatively low velocities to avoid noise and drafts. Supply ducts for all zones are furred in walls until they reach the basement, where they connect to individual fans.

All zones have a separate conditioner, fan, and motor, and are located within a central plenum chamber. Both return and fresh air are mixed in the plenum before entering the conditioners, and each conditioner has an individual fresh air duct from the main shaft to the roof to guarantee a minimum amount to the zone at all times.

All centrifugal fans are run at half-speed after hours. This operation is controlled automatically by a time clock. The whole system is completely automatic, summer and winter.

Each zone is equipped with a modutrol thermostat, compensating thermostat, and humidistat. In addition, the whole system is controlled by an outside-inside temperature compensator, which allows the inside temperature to vary from 72 to 80° F., while the outside varies from 72 to 95° F. This prevents too much shock on leaving and entering the building.

When outside conditions warrant it, all fresh air can be used, and a humidity control prevents this when high humidity prevails. In case of fire anywhere in the building, all equipment is shut off.

## Kansas City Committee Will Study Codes

KANSAS CITY, Mo.—A "Special Committee on Air Conditioning Codes" has been appointed by R. J. DeMotte, president of the Kansas City Chamber of Commerce, to make a study of air-conditioning codes and make recommendations to the city.

Arthur S. Keene, of Keene & Simpson, is chairman of the committee, and Alonzo H. Gentry, of Gentry, Voskamp & Neville, architects, is vice chairman.

Other members are: E. Kemper Carter, Carter-Waters Corp.; W. L. Cassell, mechanical engineer; Frank J. Dean, Jr., Dean-Hagney Corp.; George Fiske, General Electric Co.; W. H. Gardner, chief, Underwriters Fire Patrol; J. O. Gill, Missouri Inspection Bureau; Fire Chief T. J. Hardwick; Anson D. Marston, Kansas City Power & Light Co.; Ben Natkin, Natkin & Co.; Henry J. Nottberg, U. S. Engineering Co.; W. F. Otis, York Ice Machinery Corp.; and C. G. Roush, Westinghouse Electric & Mfg. Co.

## Morsbach Joins Chicago Office of Bush Mfg.

CHICAGO—M. H. Morsbach has joined the Chicago office of the Bush Mfg. Co., manufacturer of coils, as air-conditioning sales engineer. He will assist Clark Bridgman, manager of the Chicago office, specializing on the sale of coils for air conditioning.

Mr. Morsbach was formerly manager of the commercial refrigeration department for Air Comfort Corp., Carrier Chicago distributor, and before that was for three years manager of dealer sales for the commercial refrigeration department of the Westinghouse Electric Supply Co. of Chicago.

He has also had field and sales engineering experience with Armour

& Co., Reliance Refrigerating Machine Co., Brunswick-Kroeschell Co., Thermal Units Co., and the Warren Webster & Co.

A graduate in mechanical engineering from the University of Wisconsin, Mr. Morsbach took post graduate work in heating, ventilating, and air conditioning at the Armour Institute of Technology.

## Complete System Installed In Station WCBS

SPRINGFIELD, Ill.—One of the features of the new broadcasting rooms and offices of radio station WCBS is the complete year-around air-conditioning system recently installed by Henson Robinson Co., air-conditioning engineers here.

## THE BUYER'S GUIDE



**TYLER** The Original WELDED STEEL Commercial Refrigerators

**NEW 1939 FEATURES**  
Tyler's original welded steel construction is still the most advanced in the commercial refrigeration field. And the 1939 line is the greatest ever. New improvements include wider doors, for greater accessibility; wider front glass for increased visibility and new, patented NON-GLARE lighting system for brighter display.

**THE BIG VALUE LINE**  
Complete line covers wide field. Built from experience with thousands of installations. Offers sensational values because of standardized quantity production. You can meet today's demands with Tylers and make more money. Write NOW for dealer proposition.

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**TYLER FIXTURE CORP. Dept. R, NILES, MICH.**

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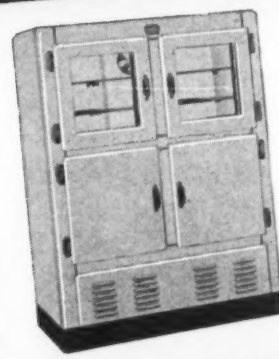
Constantly working for more sales. Without obligation let our artists create for you an embossed nameplate that will go far beyond merely identifying your product. Today—write for details that will make your plate part of your sales force.

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1914—Our Silver Anniversary—1939

## The profit line for '39 INCLUDES REACH-IN REFRIGERATORS



Sell more compressors by including Sherer refrigerators on your contract. Customers prefer one source for equipment and service.

A complete line—New Developments—Free Store Layouts—Advertising Support—make the Sherer Profit Line easier to sell.

Write for catalog and franchise details, mentioning territory desired.

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Manufacturers of Refrigerated Display and Storage Equipment





## Foreign News

### Century Refrigeration, Ltd. Plans To Market Refrigerator For 'Middle Class' Englishman

By Alfred Jones

DETROIT—To manufacture and sell a household electric refrigerator for the middle-class Englishman of moderate income, Century Refrigeration (1938) Ltd. has been organized in London and will produce about 1,200 units in 1939, declared T. D.

Bayne, director, when interviewed when he visited here recently.

Mr. Bayne was on a flying trip to the United States to shop for refrigerating units, since his firm plans to begin operations by making the cabinets and installing the mechanism.

He arrived in New York City on Jan. 23, and expected to sail for home Feb. 10 on the "Queen Mary." "We hope to break new ground in England," said Mr. Bayne, "by making a refrigerator for the middle class. Present refrigerator companies are asking too much, and we feel that a good unit at a reasonable price is wanted."

"Our firm had been in existence for about four years, but in the last few weeks of 1938 we completely reorganized the company and gave it the new name of Century Refrigeration (1938) Ltd."

Offices are at 12 Princes St., Hanover Square, W.1, and the factory is at Trenmar Gardens, Harrow Road, N.W.10, London.

The 1939 line of "Century" refrigerators will be made in four sizes—3.2, 4.5, 6, and 8-cu. ft. storage capacity. Mr. Bayne announced that the 4.5-cu. ft. refrigerator will be priced at £28, or about \$135.

To cover thoroughly the market in the British Isles, Century Refrigeration is establishing a complete distributor setup by dealing directly with outstanding distributors. It also is planned to work out a co-operative program with the electric power utilities to further educate the buying public to the value of electric refrigeration and arouse greater demand, Mr. Bayne explained.

"There is a big field for refrigeration in England," Mr. Bayne pointed out, "but the people are not 'refrigeration-conscious' yet. However, the electric refrigerator is coming out of the luxury class, and is beginning to come into common acceptance."

### 'Milk Bars' Educating South Africans To Ice Cream; Boost Commercial Unit Sales

DETROIT—Spreading popularity of "milk bars" and increasing public demand for refrigeration have given impetus to a boom in household and commercial refrigeration sales in the Union of South Africa, declared Arthur G. Jorgensen, of Johannesburg, visiting here during the American stage of his current three-continent business tour.

On his extensive jaunt, Mr. Jorgensen is really covering territory. He left South Africa last November and went to England for a while. Then he came over to America, and before he sails back to England he will have traveled through most of the eastern and middle western states, and will have traversed Canada as far west as Vancouver.

When he gets back to England, Mr. Jorgensen will wind up his affairs and go over to the continent for visits to Germany, Belgium, Czechoslovakia, and other European countries. Eventually he will return home to South Africa, probably towards the end of May.

His present visit to America is Mr. Jorgensen's third in the last five years, and each time he comes over, he says, he picks up a new car. This time he bought a Studebaker, and he will send it back to Johannesburg.

Discussing refrigeration in South Africa, Mr. Jorgensen said, "You know, of course, that South Africa

is America's best export market for refrigeration."

"Refrigeration is an absolute necessity there, particularly commercial. And refrigerators are not concentrated only in certain cities; they are widespread throughout the entire country."

"Commercial refrigeration is just beginning to come into its own, because South Africa hasn't been an ice cream or cold drink country. At the present time, however, milk bars are very popular, and are sprouting up all over. This is a boost for commercial refrigeration."

"Electricity is very cheap, and is almost entirely steam made." Mr. Jorgensen said that the South African climate makes refrigeration extremely valuable, although he added that it is never unbearably hot.

He had just received a letter from a friend back home in which the latter said he was writing in his shirt sleeves and his arms were sticking to the paper. It's mid-summer down in South Africa right now.

As head of Arthur G. Jorgensen Pty. Ltd., Mr. Jorgensen is distributor in South Africa for Harold L. Schaefer, Inc., Minneapolis manufacturer of commercial refrigeration cabinets, and for Kelvinator and Norge refrigerators and appliances.

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Canadian distributor: Refrigeration Supplies Co., Ltd., London, Ontario

Message No. 31



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Central Tower, San Francisco, Calif.

### Australian Executive, After World Tour, Doesn't Fear War

DETROIT—World economic recovery is well on the road, believes George H. Harris of Harris, Hutchinson Pty. Ltd., Sydney, Australia, who was in Detroit last week-end on one of the last legs of a 'round-the-world trip.

Mr. Harris, whose firm claims to be the largest manufacturer of commercial refrigeration cabinets in Australia, with a big export business besides, left Australia in September, and has visited commercial centers in the Far East, Africa, Europe, and America. He is leaving Vancouver, B. C., March 15, and will arrive in Sydney April 8.

Utilizing its own sheet metal and porcelain plants, Mr. Harris's concern is turning out commercial cabinets of advanced design and styling for the world market. Business is excellent in the East Indies and Africa, he declares, and is good in Europe despite the war talk.

Mr. Harris declares that the United States is currently much more excited over war possibilities than is Europe. It's his opinion that Italy and Germany have gone as far as France and Britain will allow; and that the rearmament programs of the latter have proceeded so fast that the dictator powers won't dare attack now.

Additional factors on the side of England, he declares, include the fact that all the Dominions except Canada have declared they will send men and money to aid Britain in the next war, plus the feeling that "there must be a secret agreement between England and America."

When America gets the "war bug" out of its system, Mr. Harris feels, it should be ready to rejoin the rest of the world in the substantial economic recovery which is now taking place.

### 2 Egyptian Hospitals Install Air Cooling For Operations

ALEXANDRIA, Egypt—An air-conditioning system consisting of two Freon compressors and a Carrier "Weathermaker" has been installed in the Al Moassat hospital here. Controls and accessories are provided for conditioning two operating rooms.

Similar equipment has been installed in Demerdash hospital in Cairo to air condition operating rooms.

These two installations mark a further advance in Egypt's drive to modernize all hospitals and make room conditions comfortable and healthful.

### Figures on Appliances In Use Reveal Large Untouched Market In Argentina

BUENOS AIRES, Argentina—Approximately 33,000 electric refrigerators and 15,000 electric ranges are now in use in this country, according to a compilation of estimates by the Argentine Institute of Applied Electricity, and Compania Argentina de Electricidad, and several of the larger importers.

Number of radios in use in the country is estimated at about 1,000,000, including battery sets, and it is estimated that 35,000 vacuum cleaners are now in service. Washing machine use is low, however, best available figures showing only about 500 such units now in use in the country.

Refrigerator sales per year are estimated at about 6,500 units on the average, with the average cost per unit being about 750 pesos. About 70% of these units are sold on the instalment payment plan.

Electric range sales have a yearly sales average of about 3,000 units, at an average price of 220 pesos, and about 75% of the sales being on the time-payment basis.

Sales of radios average about 200,000 units yearly, at an average price of 175 pesos, with 75% of the units sold on the instalment plan. Vacuum cleaner sales average 4,000 units per year, at an average price of 160 pesos. About 80% of the units are sold on time payment.

Annual washer sales average 150 units, at an average price of 300 pesos, and time payment sales account for about 50% of the sales total.

It is reliably estimated that there are 1,000,000 homes in Argentina wired for electricity, of which 590,000 are located in Buenos Aires and immediate vicinity.

000 are located in Buenos Aires and immediate vicinity.

Retail list prices on American-name electric refrigerators range from 1,150 to 1,250 pesos in the 5-cu. ft. size, with cash discounts of 10% from two companies and 15% from a third. An important electric refrigerator sold under a local trade name (S.I.A.M.) has no 5-cu. ft. size, but has a list price of 891 pesos in the 4-cu. ft. size and 1,161 pesos in the 7-cu. ft. size, with 20% cash discount.

There is a wide range on retail prices of radio sets, although a six-tube American-name set is quoted at around 300 pesos, whereas a comparable domestic set is offered at 180 to 200 pesos. There are locally-built sets offered at much lower prices, as many of them are built by small set-assemblers or amateurs.

This "amateur competition" in radio set manufacture is said to prevail to a greater extent in Argentina than in any other market.

Population in Argentina at the end of 1937 was estimated at 12,761,611 persons, which can be roughly estimated at 2,552,322 families, figuring six persons to a family.

### Macondray & Co. To Handle Refrigerant Products

MANILA, P. I.—Macondray & Co., Inc. has been appointed sales representative here for Virginia Smelting Co., and will distribute the company's "Esotoo," "V-Meth-L," and methylene chloride refrigerants in the Philippine Islands.

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Stopping at the Detroit means assurance of two things: Fine accommodations, and reasonable cost. The rooms are famous for tasteful furnishings and restful beds; and the hotel is noted for its cordial atmosphere. Yet you cannot pay more than \$3. single!



14

The sales the N. Assoc. electri 1939: Cro tric 1 Div. Produ Mfg. Elec

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States an Territorie

Alabama Arizona Arkansas California Colorado Connecticut Delaware District of Columbia Florida Georgia Idaho Illinois Indiana Iowa Kansas Kentucky Louisiana Maine Maryland Massachusetts Michigan Minnesota Mississippi Missouri Montana Nebraska Nevada New Hampshire New Jersey New Mexico New York North Carolina North Dakota Ohio Oklahoma Oregon Pennsylvania Rhode Island South Carolina South Dakota Tennessee Texas Utah Vermont Virginia Washington West Virginia Wisconsin Wyoming

Total Units Canada Other Foreign U. S. Foreign Total For



## 147,623 Household Refrigerators Sold In January By 15 Nema Companies

The following 15 companies reported sales to the Refrigeration Division of the National Electrical Manufacturers Association (Nema) on household electric refrigerators for January, 1939:

Crosley Corp., Edison General Electric Appliance Co., Inc., Frigidaire Div. General Motors Corp., Gale Products Div. Outboard, Marine & Mfg. Co., General Electric Co., Gibson Electric Refrigerator Co., Kelvinator

Div. Nash-Kelvinator Corp., Leonard Div. Nash-Kelvinator Corp., Norge Div. Borg-Warner Corp., Sparks-Withington Co., Stewart-Warner Corp., Sunbeam Electric Mfg. Co., Uniflow Mfg. Co., Universal Cooler Corp., and Westinghouse Electric & Mfg. Co.

The sales of the reporting companies include units manufactured for the following concerns: Montgomery Ward & Co., Potter Refrigeration Corp., and Sears, Roebuck & Co.

### SALES FOR JANUARY, 1939

	Domestic	Canadian	Other Foreign	Total
<b>Lacquer (Ext.) Cabinets Complete</b>				
1. Chest	161	1	2	164
2. Less than 3 cu. ft.	...	51	30	81
3. 3 to 3.99 cu. ft.	2,209	2	502	2,713
4. 4 to 4.99 cu. ft.	13,709	671	2,031	16,411
5. 5 to 5.99 cu. ft.	30,711	504	1,007	32,222
6. 6 to 6.99 cu. ft.	68,953	302	865	70,120
7. 7 to 7.99 cu. ft.	5,052	6	89	5,147
8. 8 to 8.99 cu. ft.	8,638	19	206	8,863
9. 10 to 12.99 cu. ft.	36	...	...	36
10. 13 cu. ft. and up	1	...	...	1
<b>11. Total Lacquer</b>	<b>129,470</b>	<b>1,556</b>	<b>4,732</b>	<b>135,758</b>
<b>Porcelain (Ext.) Cabinets Complete</b>				
12. Up to 4.99 cu. ft.	130	13	5	148
13. 5 to 5.99 cu. ft.	2,338	60	195	2,593
14. 6 to 6.99 cu. ft.	5,346	7	154	5,507
15. 7 to 7.99 cu. ft.	875	1	56	932
16. 8 to 8.99 cu. ft.	1,528	7	82	1,617
17. 10 to 12.99 cu. ft.	211	1	9	221
18. 13 cu. ft. and up	120	1	24	145
<b>19. Total Porcelain</b>	<b>10,548</b>	<b>90</b>	<b>525</b>	<b>11,163</b>
<b>20. Total—Lines 11 and 19</b>	<b>140,018</b>	<b>1,646</b>	<b>5,257</b>	<b>146,921</b>
<b>21. Separate Systems 1/4 hp. or less</b>	<b>77</b>	<b>75</b>	<b>312</b>	<b>394</b>
<b>22. Separate Household Evaporators</b>	<b>27</b>	<b>54</b>	<b>227</b>	<b>308</b>
<b>23. Total—Lines 20, 21, and 22</b>	<b>140,052</b>	<b>1,775</b>	<b>5,796</b>	<b>147,623</b>
<b>24. Condensing Units 1/4 hp. or less</b>	<b>172</b>	<b>19</b>	<b>216</b>	<b>407</b>
<b>25. Cabinets—No Systems</b>	<b>22</b>	<b>1</b>	<b>13</b>	<b>36</b>
<b>Index Value* of Total Dollar Sales</b>	<b>203.0</b>	<b>551.0</b>	<b>101.0</b>	<b>197.0</b>

\*Based on weighted sales for 1934, 1935, and 1936.

†Includes sales and credits.

Note: It is estimated that the figures on electric household refrigerators reported to Nema includes more than 90% of the industry.

### Price Resigns Carrier Vice Presidency

(Concluded from Page 1, Column 2) ing & Ventilating Corp., which became a part of Carrier Corp. in 1931.

During his early Carrier activities, Mr. Price had charge of the program for residential air conditioning and national distribution of both installed and packaged air-conditioning equipment through dealers.

He also was active in many industry activities, most recent of which was his election as president of Air Conditioning Manufacturers' Association.

### Sales-By-States

States and Territories	Quantity Household Low Sides
Alabama	1,296
Arizona	666
Arkansas	1,274
California	10,215
Colorado	1,150
Connecticut	2,020
Delaware	407
District of Columbia	1,319
Florida	2,292
Georgia	1,832
Idaho	474
Illinois	10,352
Indiana	4,397
Iowa	3,080
Kansas	1,654
Kentucky	1,747
Louisiana	1,808
Maine	717
Maryland	1,171
Massachusetts	5,569
Michigan	6,681
Minnesota	3,980
Mississippi	825
Missouri	3,146
Montana	338
Nebraska	1,262
Nevada	193
New Hampshire	517
New Jersey	4,310
New Mexico	542
New York	14,082
North Carolina	2,853
North Dakota	242
Ohio	9,353
Oklahoma	2,405
Oregon	1,126
Pennsylvania	13,253
Rhode Island	805
South Carolina	1,259
South Dakota	289
Tennessee	2,245
Texas	4,744
Utah	902
Vermont	276
Virginia	1,695
Washington	3,173
West Virginia	1,474
Wisconsin	3,928
Wyoming	194
<b>Total United States</b>	<b>140,052</b>
Canada	1,775
Other Foreign (Including U. S. Possessions)	5,796
<b>Total For World</b>	<b>147,623</b>

## CLASSIFIED ADVERTISING

RATES: Fifty words or less in 6-point light-face type only, one insertion, \$2.00, additional words four cents each. Three consecutive insertions \$5.00, additional words ten cents each.

PAYMENT in advance is required for advertising in this column.

REPLIES to advertisements with Box No. should be addressed to Air Conditioning & Refrigeration News, 5229 Cass Ave., Detroit, Mich.

### POSITIONS AVAILABLE

COMMERCIAL REFRIGERATION sales manager needed by Carrier Corp. as result of present commercial refrigeration expansion program. Salary and bonus. Please write, stating experience, qualifications, and references. Box 1127, Air Conditioning & Refrigeration News.

### REPRESENTATIVES WANTED

MANUFACTURER'S REPRESENTATIVE wanted: With commercial refrigeration experience, to sell beverage coolers to distributors, dealers, and bottlers. Write today giving full details, age, experience and territory familiar with. Excellent opportunity for producers. UNDA BAR COOLER CORPORATION, 2800 N. 9th St., St. Louis, Mo.

WANTED: FACTORY Representatives in U. S. and Canada to sell refrigeration supply jobs on commission basis. THAW-ZONE "A" liquid dehydrator and acid neutralizer, in use commercially two years. Efficiency thoroughly proved. Desire representatives already established and calling upon jobbers in their territory. HIGH-SIDE CHEMICALS CO., 195 Verona Ave., Newark, New Jersey.

### POSITIONS WANTED

MECHANICAL ENGINEER. 16 years' experience in household refrigeration and air conditioning; cabinet and unit design, developments and tests. Thorough knowledge of service set-ups and extensive experience in contacting dealers and distributors and handling their problems. Capable advancing new ideas on major household appliances and following through with design and production. Box 1126, Air Conditioning & Refrigeration News.

PROMOTION & ADVERTISING man now with prominent case manufacturer. Tested and proved ability in advertising preparation—sales promotion—general sales correspondence—field supervision and improvement of relations between company and dealers. Will consider connection with large, aggressive manufacturer, any location. Age 30—single. Good approach—congenial—energetic—enthusiastic. Box 1128, Air Conditioning & Refrigeration News.

YOUNG MAN wants position in commercial refrigeration or air conditioning business where advancement is possible. Age 28, 4 years' college plus 2 years' refrigeration and air conditioning training; athletic; likes hard work; inventive; ambitious; reliable; 100% honest; single; go anywhere. Address Box 549, Republic, Pa.

### REPRESENTATIVES AVAILABLE

BACKED BY 30 years' experience in commercial refrigeration (15 of which I have been sales manager and engineer of Kelvinator Commercial in Baltimore), I have decided to open offices in Baltimore as a manufacturer's representative. I would like to hear from those manufacturers of condensing units, self-contained air conditioners, coolers and cases, ventilating fans, insulating material and allied refrigeration lines who desire representation in Maryland and Virginia. H. LANE COOKE, 1309 John Street, Baltimore.

### FRANCHISE AVAILABLE

STANDARD AUTOMATIC Oil Burner with 3 Minneapolis-Honeywell controls, \$58.50. Write for quantity discounts and available territories. Lowest prices since 1925 in the manufacturing of this burner. Equipped with Standard resilient mounted long hour motor, Tuthill fuelstat, Torrington fan. NATIONAL ARCOIL CORP., 471 Broad Street, Newark, N. J.

COMMERCIAL LINE refrigerator display cases, walk-in coolers, and refrigerators; also direct draw, mechanically-cooled beer coolers. Sell with Ehrlich compressors or with any other make. Attractive discounts, also financing arrangements to help sell. 70 years in business. Write for full information. EHRLICH REFRIGERATOR MFG. CO., St. Joseph, Mo.

### ENGINEERING SERVICE

REGISTERED CONSULTING Engineer with twenty years' experience designing and developing heating, refrigerating, and air conditioning equipment and systems. Complete staff of experts and laboratory available for designing and developing products or laying out systems. Will furnish ideas, or work out yours. F. O. JORDAN (ASRE), 2150 Lawrence, Chicago.

### REPAIR SERVICE

GENERAL ELECTRIC and Westinghouse hermetic unit replacement and rebuilding service. One year unconditional guarantee. All units are completely rebuilt on a modern production line, tested through every step of rebuilding with complete test equipment, subjected to exhaustive operation tests for wattage, efficiency, quietness and then Duco finished. General Electric DR1, DR2, and Westinghouse, \$30.00. Quotations furnished on other models. Quick service—guaranteed work. REFRIGERATION MAINTENANCE CORPORATION, 321-27 East Grand Avenue, Chicago.

CONTROL REPAIR service. Your controls repaired by expert mechanics, with special precision equipment. Supervised by graduate engineers. We stress perfection and dependability before price. One year guarantee on domestic controls. Any bellows operated device repaired. HALECTRIC LABORATORY, 1793 Lakeview Road, Cleveland, Ohio.

### PATENTS

HAVE YOUR patent work done by a specialist. I have had more than 25 years' experience in refrigeration engineering. Prompt searches and reports. Reasonable fees. H. R. VAN DEVENTER (ASRE), Patent Attorney, 342 Madison Avenue, New York City.

## Jan. Refrigerator Sales 43% Higher Than '38

(Concluded from Page 1, Column 3) during the month, as compared with 106,862 units reported shipped by 17 member-companies of Nema during the same month of last year.

Shipments by Nema companies to distributors and dealers in the United States alone amounted to 140,052 units during January, a gain of 43% over the 97,641 units reported shipped in January, 1938. All-time high for the month was set in 1937, when shipments totaled 172,758 units, with 15 firms reporting.

Lacquer-exterior cabinets enjoyed a preference of more than 12-to-1 in the January Nema sales summary.

New York state accounted for approximately 10% of January Nema shipments in the United States, with 14,082 units. Pennsylvania, with 9,507 or 13,253 units, was second; Illinois, with 7.8% or 10,932 units, was third; and California, with 7.3% or 10,215 units, was fourth.

## New Zenith Filter Has 'Sight Feed'

DETROIT—A new "sight-feed" filter, having a feature of visibility which makes it possible to see the refrigerant as it passes through the line, has been introduced by Zenith Carburetor division of Bendix Aviation Corp.

Heavy sight glass embodied in the filter is the means of observing the flow of refrigerant. Presence of bubbles in the refrigerant indicates a shortage of refrigerant in the system. Location of the sight glass directly over the filter element enables the operator to determine whether the filter is plugged and in need of cleaning.

The new filter is said to have all of the features of the company's liquid-line filters, plus the added advantage of visibility.

## THE BUYER'S GUIDE



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for Commercial Use

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All of the above units made to use with Freon, Methyl Chloride and Ammonia

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- ☐ No. 3. Detailed data on methods of servicing special types of refrigerators. 144 pages...\$1.00
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### COMMERCIAL SERVICE MANUALS

- ☐ No. C-1. The theory and principles of refrigeration presented more completely. 96 pages...\$1.00
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- ☐ Manual E-1. Dealing with large refrigeration equipment. This book is valuable to operators of industrial refrigeration plants. 224 pages .....\$2.00
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### AIR CONDITIONING MANUALS

- ☐ No. A-1. The principles of summer air conditioning and describing typical air-conditioning systems, performance, etc. 112 pages. Price .....\$1.00
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- ☐ No. A-6. Principles of load estimate and equipment selection for all types of installations. 96 pages. Price .....\$1.00

- ☐ No. A-7. Application of load estimating and equipment selection principles for domestic and commercial installations. 96 pages. Price .....\$1.00
- ☐ Manual B-1. For contractors and estimators. Twenty-five typical air-conditioning jobs explained and estimated. 136 pages...\$1.00

### BUYER'S GUIDE

- ☐ No. D-6. The new 1939 Refrigeration and Air Conditioning Directory containing listings of all manufacturers of complete refrigeration and air-conditioning equipment, parts, materials, and supplies. Complete listings including names of manufacturers and addresses. 220 pages...\$1.00

Note: The minimum extra charge for each package of books shipped outside the U. S. is 50 cents. Up to six \$1.00 books may be shipped in one package.

Enclosed is \$.....

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## EARNINGS

### CROSLEY CORP.

CINCINNATI — Net profit of \$84,901, after depreciation and Federal income tax, on net sales of \$12,991,320, was reported by Crosley Corp. for the year ended Dec. 31, 1938. This compares with a net loss of \$376,915, including flood and fire losses amounting to \$343,314, on net sales of \$18,735,450 in 1937.

Balance sheet as of Dec. 31, 1938 carried current assets at \$5,170,989, and current liabilities at \$1,112,496, compared with \$5,739,463 and \$1,812,808, respectively, a year earlier. Latest statement gives cash of \$466,363, against \$186,951 at the end of 1937.

### WESTINGHOUSE

EAST PITTSBURGH, Pa.—Despite a drop of 35% in the volume of orders for 1938, Westinghouse Electric & Mfg. Co. made a profit every month during the year, the company's report reveals.

Net income, however, fell from \$20,126,408 or \$7.66 a share in 1937 to \$9,052,773, equal to \$3.38 a share on the 2,592,155 shares of common stock outstanding, after preferred dividends.

Orders last year amounted to \$149,662,776, compared with \$229,540,061, and the company began this year with a backlog of \$40,188,150 in orders, about \$20,000,000 less than the year before.

Current assets were \$110,287,348, and liabilities \$11,606,763. A year ago, current assets were \$132,100,470, and liabilities were \$32,917,072.

In releasing the report, Westinghouse Chairman A. W. Robertson and President George H. Bucher told stockholders that "there are definite signs of an improvement in business," which they expect will continue "throughout the year."

### APEX

CLEVELAND—Net earnings of \$3,397 on a net sales volume of \$7,542,883 is reported by Apex Electrical Mfg. Co. for 1938. Sales last year were down 27.6% from their 1937 total, when the aggregate figure was \$10,426,298. Net earnings in 1937 were \$294,724.

In a letter to stockholders, accompanying the annual reports, President C. G. Frantz points out that the entire industry experienced a drop in unit volume of from 30 to 50% under comparative figures for the preceding year.

Early part of the year was particularly bad, he said, but the latter months of 1938 improved gradually, equalizing to some extent the earlier months' poor showing.

First two months of 1939 show a continued improvement in Apex sales, Mr. Frantz said. Sales for January and February are running more than 40% ahead of the same period last year. Factory employment also has increased, with two shifts operating at capacity.

### AUTOMATIC WASHER CO.

NEW YORK CITY—Automatic Washer Co. reports a net loss of \$105,174 for 1938. This compares with a net income of \$21,859, equal to 17 cents a common share, based on capitalization pursuant to a plan of reorganization adopted in 1937 and effective Jan. 8, 1938, for the preceding year.

### TRANE CO.

CHICAGO—While 1938 earnings of Trane Co., manufacturer of heating and air-conditioning equipment, were less than those of 1937, both incoming business and unfilled orders this year are ahead of last, it was revealed by Reuben N. Trane, president, in the annual report to stockholders.

Consolidated net income for 1938 was \$196,625, or 71 cents a common share, as compared with \$397,112, or \$1.51 a share for 1937, the report showed.

In commenting on the year's earnings, Trane pointed out to stockholders that "the officers and directors, though somewhat disappointed, want you to know that the company is one of the relatively few in the air-conditioning industry to report any profit whatsoever. As a matter of fact, so far as is known by us, the dollar profit recorded by the

company is the largest recorded by any company in the field regardless of size producing a similar line of products."

Sales amounted to \$3,639,857 for 1938, compared with \$4,558,178 for 1937, a decrease of 20.1%. However, heating equipment sales actually exceeded those of 1938, according to the report. Nine new branch offices were opened during the year.

### No Price Law In Vermont

MONTPELIER, Vt.—Efforts to set up fair trade legislation for Vermont met with a second set-back when the state senate, by a three-vote margin, refused to advance to third reading a bill permitting manufacturers of trademarked products to fix minimum resale prices. A similar measure was killed in the 1937 legislature.

### Thompson and McPherson Address Missouri R.S.E.S.

OMAHA, Neb.—R. J. Thompson, sales engineer for Kinetic Chemicals, Inc., Wilmington, Del., and Hal McPherson of Electromatic Co., Chicago, were the speakers at the March meeting of the Missouri Valley chapter of Refrigeration Service Engineers Society held at the Nebraska Power Service building here.

### Ridgeley Heads Sales

COLUMBUS, Ohio—Arthur G. Ridgeley has been appointed general manager of Appliance Distributing Co., 163 North Ludlow St., central Ohio distributor of electrical appliances.

### Ridge Co. Will Distribute Crosley In Indiana

SOUTH BEND, Ind.—The Ridge Co. here has been appointed distributor of Crosley products in northern Indiana. William Carroll, Crosley territorial manager, and Charles Deneen, representative of Altorfer Bros. (ABC washers), were speakers at a recent meeting at which new lines were shown to dealers.

### Reusing's Appoints Church

ASHEVILLE, N. C.—Bland Church, formerly connected with Morris Austin Co., Hotpoint dealer here, has been named sales manager of Reusing's, Inc., local Frigidaire outlet.

### 10 Central Systems Sold In Chicago In February

CHICAGO — Ten central-station air-conditioning systems with a combined capacity of 96 hp. were sold by dealers in the Chicago area during February, Commonwealth Edison Co. announces.

This compares with sales of 16 plants having an aggregate capacity of 404 hp., reported in the same month last year.

January sales were 15 installations with a combined capacity of 402 hp.

Four of February's air-conditioning contracts were for systems to be installed in general offices, four were for restaurants, and two were for clothing stores. Three electric room coolers also were sold by dealers during the month.

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### SEMI-AUTOMATIC DEFROSTER

To defrost it is only necessary to stop the compressor and fan motor. Then swing the defrosting panel to its upward position, which starts the defrosting process immediately.

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This unit is equipped with the new PEERLESS Thermek Cooling surface. The extended surface is more efficient, because in low temperature work it has less frost accumulation than the usual flat forms of extended surface.

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